The EDISON ELECTRIC INSTITUTE BULLETIN

December 1955

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Published Monthly by Edison Electric Institute

The Electric Utilities—Opportunity and Challenge

Harllee Branch, Jr.

Modern Wiring

George E. Whitwell

Electronic Computer Programming

J. W. Balet

Accounting System Design: Electronic Computers

F. J. Porter, Jr.

Utility Problems within Highway Rights-of-Way

John W. Anderson

ELECTRICAL RESEARCH STATISTICS
THE ELECTRIC LIGHT AND POWER INDUSTRY

Current Statistical Data Covering 100 Per Cent of Industry

(Includes Investor-Owned Companies, Cooperatives, and Government-Owned Utilities)

September, 1954-1955

SOURCE AND DISPOSAL OF ENERGY—MONTH OF SEPTEMBER

	1955	1954	%
NET GENERATION* (Kwhrs in Thousands)			
By Fuel Burning Plants	38,167,928	31,737,362	+20.3
By Water Power Plants	8,167,068	7,802,020	+ 4.7
Total Generation	**46,334,996**	**39,539,382**	**+17.2**
Add—Net Imports Over International Boundaries	89,728	127,818	−29.8
Less—Company Use	129,984	135,034	− 3.7
Less—Energy Used by Producer	993,816	844,545	+17.7
Net Energy for Distribution	**45,300,924**	**38,687,621**	**+17.1**
Lost and Unaccounted for	3,179,020	3,489,526	− 8.9
Sales to Ultimate Customers	**42,121,904**	**35,198,095**	**+19.7**

CLASSIFICATION OF SALES

NUMBER OF CUSTOMERS—As of September 30th			
Residential or Domestic	44,103,477	42,820,097	+ 3.0
Rural (Distinct Rural Rates)	1,655,719	1,636,793	+ 1.2
Commercial or Industrial:			
Small Light and Power	6,052,832	5,992,086	+ 1.0
Large Light and Power	290,072	282,440	+ 2.7
Other Customers	170,298	163,813	+ 4.0
Total Ultimate Customers	**52,272,398**	**50,895,229**	**+ 2.7**
KILOWATTHOUR SALES—During Month of September (Kwhrs in Thousands)			
Residential or Domestic	9,812,100	8,723,145	+12.5
Rural (Distinct Rural Rates)	1,213,089	1,117,529	+ 8.6
Commercial or Industrial:			
Small Light and Power	7,475,958	6,659,195	+12.3
Large Light and Power	21,981,520	17,171,718	+28.0
Street and Highway Lighting	355,891	327,679	+ 8.6
Other Public Authorities	875,731	798,182	+ 9.7
Railways and Railroads:			
Street and Interurban Railways	194,301	198,796	− 2.3
Electrified Railroads	159,699	150,692	+ 6.0
Interdepartmental	53,615	51,159	+ 4.8
Total to Ultimate Customers	**42,121,904**	**35,198,095**	**+19.7**
Revenue from Ultimate Customers (Thousands)	**$695,804**	**$621,259**	**+12.0**

RESIDENTIAL OR DOMESTIC SERVICE

AVERAGE CUSTOMER DATA—For 12 months ended September 30, 1955			
Kilowatthours per Customer	2,698	2,497	+ 8.0
Average Annual Bill	$71.77	$67.42	+ 6.5
Revenue per Kilowatthour	2.66¢	2.70¢	− 1.5

* By Courtesy of the Federal Power Commission.

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The objectives of the Edison Electric Institute are:

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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CONVENTIONS AND MEETINGS

1956

JANUARY

12-13 EEI Residential Lighting Committee, Edgewater Beach Hotel, Chicago, Ill.

15-17 EEI Dealer Coordination Committee, Conrad Hilton Hotel, Chicago, Ill.

16-17 EEI-AGA Accounting Development Services Committee, Hotel Carter, Cleveland, Ohio

16-19 CEA East Division Meeting, Halifax, N. S.

19 EEI Financing and Investor Relations Committee, Hotel Biltmore, New York, N. Y.

19 EEI Industrial Relations Committee, jointly with AGA Personnel Committee, Biltmore Hotel, New York, N. Y.

19-20 PUAA Region #9 Meeting, Phoenix, Ariz.

20 Oklahoma Utilities Association, Accounting Section, Alvin Hotel, Tulsa, Okla.

23-25 American Society Heating & Air Conditioning Engineers Annual Meeting, Cincinnati, Ohio

26-27 EEI-AGA Taxation Accounting Committees, The Cloisters, Sea Island, Ga.

30-Feb. 1 EEI Prime Movers Committee, Warwick Hotel, Philadelphia, Pa.

30-Feb. 3 American Institute Electrical Engineers, Winter Meeting, Hotel Statler, New York, N. Y.

31-Feb. 1 EEI-AGA Plant Accounting and Property Records Committee, Hotel Carleton, Pittsburgh, Pa.

FEBRUARY

2- 3 Missouri Valley Electric Association, Industrial and Commercial Sales Conference, President Hotel, Kansas City, Mo.

2- 3 EEI-AGA Conference Planning, Wm. Penn Hotel, Pittsburgh, Pa.

2- 3 PEA Transmission & Distribution Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

6- 7 EEI Commercial Electric Space Heating & Air Conditioning Committee, Atlanta, Ga.

6-10 National Industrial Electric Heating Conference, Netherland Plaza Hotel, Cincinnati, Ohio

7- 8 EEI Industrial Power & Heating Group, Netherland Plaza Hotel, Cincinnati, Ohio.

7- 8 EEI Transmission and Distribution Committee, Warwick Hotel, Philadelphia, Pa.

9-10 PEA Electrical Equipment Committee, Ben Harris Hotel, Harrisburg, Pa.

9-10 PEA Relay Committee, Benjamin Franklin Hotel, Philadelphia, Pa.

9-10 PUAA Region #3 Meeting, Cincinnati, Ohio

9-10 Southeastern Electric Exchange Personnel Administration Section, Buena Vista Hotel, Biloxi, Miss.

13-14 EEI Electrical Equipment Committee, Homestead, Hot Springs, Va.

15-16 EEI Commercial Lighting Committee, Shoreham Hotel, Washington, D. C.

16-17 EEI Residential Promotion Committee, EEI Headquarters, New York, N. Y.

16-17 EEI Commercial Cooking and Water Heating Committee, Biltmore Hotel, Atlanta, Ga.

20-22 EEI Meter and Service Committee, Hotel Cleveland, Cleveland, Ohio.

1956

23-24 12th Annual National Adequate Wiring Conference, LaSalle Hotel, Chicago, Ill.

23-24 PUAA Region #1 Meeting, Boston, Mass.

MARCH

12-14 Southeastern Electric Exchange Annual Conference, Boca Raton Hotel, Boca Raton, Fla.

12-16 NEMA Winter Meeting, Edgewater Beach Hotel, Chicago, Ill.

15-16 EEI Industrial Relations Committee, Muehlebach Hotel, Kansas City, Mo.

18-21 ASME Spring Meeting, Multnomah Hotel, Portland, Ore.

19-22 CEA West Division Meeting, Macdonald Hotel, Edmonton, Alta.

22-23 PCEA Engineering and Operating Section, Palace Sheraton, San Francisco, Calif.

22-23 Oklahoma Utilities Association Annual Convention, Biltmore Hotel, Oklahoma City, Okla.

23-24 EEI Street Lighting Committee, Minneapolis, Minn.

26-29 22nd Annual EEI Sales Conference, Edgewater Beach Hotel, Chicago, Ill.

APRIL

6 Maryland Utilities Association Annual Business Conference, Lord Baltimore Hotel, Baltimore, Md.

11-13 Northwest Electric Light and Power Association, Engineering and Operating Section, Hotel Vancouver, Vancouver, B. C.

16-18 EEI-AGA National Conference of Electric and Gas Utility Accountants, Hotels Commodore and Biltmore, New York, N. Y.

18-19 Pacific Coast Electrical Association, Administrative Services Section, Huntington Sheraton Hotel, Pasadena, Calif.

18-20 Missouri Valley Electric Association, Engineering Conference, President Hotel, Kansas City, Mo.

30-May 2 EEI Engineering Committees, Edgewater Beach Hotel, Chicago, Ill.

MAY

2- 4 EEI Accident Prevention Committee, Sheraton Hotel, St. Louis, Mo.

7- 9 EEI Purchasing and Stores Committee Annual Meeting, Sheraton Plaza Hotel, Boston, Mass.

7- 9 Air Conditioning and Refrigeration Institute Annual Meeting, Homestead, Hot Springs, Va.

8 EEI Commercial Electric Cooking Conference, Sheraton Hotel, Chicago, Ill.

9 ECAP Copy Group Meeting, Philadelphia, Pa.

10-11 PUAA Annual Convention, Philadelphia, Pa.

14-16 Pacific Coast Electrical Association Annual Convention, Las Vegas, Nev.

17-18 PEA Electrical Equipment Committee and Relay Committee, Hotel Wm. Penn, Pittsburgh, Pa.

21 EEI-AGA Orientation Meeting, Headquarters, New York, N. Y.

21-23 Northwest Electric Light and Power Association, Business Development Section Meeting, Benjamin Franklin Hotel, Seattle, Wash.

The EDISON ELECTRIC INSTITUTE
BULLETIN

The Electric Utilities—Opportunity and Challenge

By Harllee Branch, Jr.
President, Edison Electric Institute, and President, Georgia Power Company

An address before the Investment Bankers Association of America, Hollywood, Florida, November 30, 1955

IT is a great privilege to be invited to address this group. You gentlemen, representing the investment banking business of America, are an exceedingly important part of the free enterprise system. It is largely through your efforts that investment funds are made available for the creation of new business enterprises and the expansion of existing businesses. All of us who are engaged in producing goods and supplying services for the American people are grateful for the great contribution you have made, and are making, to the beneficent capitalism under which we live.

New Capital and Growth

The electric utility industry is particularly appreciative of your efforts. For the past ten years since World War II we have experienced unprecedented growth, calling for tremendous amounts of new capital. During this decade we have witnessed the greatest physical expansion in the history of our industry. We have sought not merely to meet the actual day-to-day and year-to-year electric power requirements, but to anticipate increased future requirements. We have sought to provide, and have provided, an increasing margin of reserve generating capacity over peak demands. This margin had increased from a low of 6.1 per cent at the end of 1947 to approximately 21 per cent at the end of 1954. Comparable gains have been made in the construction of transmission and distribution facilities.

This growth was made possible not only by the industry's accurate evaluation of the job to be done and the efficiency and boldness of its planning, but also by the cooperation of your group and the American investors who provided the necessary capital. You have always met the challenge no matter how great our requirements have been.

Doubled in Nine Years

At the end of 1945 the capitalization of the electric industry stood at $13,342,000,000. Nine years later, at the end of 1954, the figure had grown to $26,736,000,000, or twice as large.

Actual construction expenditures were even higher, since new capital provided only 64 per cent of the funds required and the other 36 per cent came from internal sources.

Long-range estimates of the growth of the electric industry indicate that we will continue to double in size every ten years. Total electric generating capacity in our country, including government plants, is now about 115 million kilowatts. It is estimated that by 1965, our generating capacity will be about 215 million kilowatts and, by 1975, about 400 million kilowatts.

Our energy sales are expected to reach 850 billion kilowatthours by 1965.

Figures May Be Conservative

These figures, as fantastic as they may seem, are believed by many to be on the conservative side. For example, *Electrical World*, in a survey published last September 19, estimated that our installed capacity in 1965 will be 232 million kilowatts and that electric power consumption will have grown by 1965 to a trillion kilowatthours.

It is staggering, indeed, to contemplate that when our industry reaches those astronomical figures in 1965, we will still go on to double again in another ten years.

This forecasts a continuing need for new capital which we must call upon you and your associates to supply.

Each year for the past seven years, 1948 through 1954, new issues of electric utility securities have exceeded $1¼ billion. In three of the seven years, the new issues exceeded $1½ billion.

Expansion Estimates

On the basis of estimated expansion, our construction expenditures over the next ten years should average above $3 billion a year, ranging upward from the current rate of something over $2½ billion to about $4 billion a year by the end of the period.

However, you will be interested in knowing that, despite this expected plant expansion, our requirements for new capital are not likely to increase proportionately during the next few years since accelerated amortization and accelerated depreciation, under present tax laws, will increase the generation of internal cash. This should reduce the pro-

portion of construction funds to be raised through new security issues to something less than the 64 per cent figure previously referred to. In my own company, for example, (and our past experience has closely followed the national pattern) we anticipate we will need to go to the securities markets for something less than 60 per cent of our construction funds during the next three years. This should be good news to you and to the investing public since, if this trend is followed by the industry as a whole, we should be able to maintain present capitalization ratios with less dilution of existing common stocks and with growing market strength for those issues.

Enhanced Income Stability

From the standpoint of the investor, our industry offers a stability of income which I believe will be enhanced by two significant trends of recent years:

(1) Our residential consumption, which is least affected by business cycles, is tending to increase faster than the other components of our load. In 1945, for example, residential service provided 34.9 per cent of our revenues, but in 1954 it provided 40.1 per cent.

(2) The cost of power is a steadily diminishing element in the total operating expenses of American industrial plants. For the average industry the price of purchased power represents only 0.6 per cent of the value of the finished products. While industrial wages, taxes and the cost of raw materials and other services have steadily risen since the end of World War II, electric power bills have remained relatively stable. This means that in the event of industrial cut-backs or retrenchment, there will be less tendency to reduce the use of industrial power. In fact, a greater use of electrically-operated machines and automatic devices might be expected to occur during such periods as alert industrialists seek ways to maintain volume and reduce expenses.

Increased Dividends

It is also a significant fact, I think a remarkable fact, that during ten years of unprecedented growth, from 1945 through 1954, when our industry's capitalization increased by more than $13 billion, or about 100 per cent, we were nevertheless able to preserve the soundness of our financial structures and to increase dividends per share of common stock.

Moody's common stock weighted average of 24 electric companies shows: In 1945 earnings per share were $1.72 and dividends were $1.30. In 1954 earnings per share were $2.94 and dividends, $2.13. The market price of these stocks rose from an average of $26.29 in 1945 to $44.30 in 1954. Capitalization ratios remained fairly constant throughout the period, with an increase of about four per cent in long-term debt, a corresponding decrease in preferred stocks, and with common stock equities virtually unchanged.

Thus, the electric companies through the exercise of business prudence and by far-sighted planning were able both to improve dividends and raise sufficient capital to meet the requirements of an unparalleled growth. I think this is a really outstanding achievement and I wonder whether the average investor has fully appreciated it.

Recent Developments

There are some recent developments which I should like to mention at this time because they seem to me to have a considerable bearing on the outlook for electric utility securities.

In the first place, I should like to call attention to far-reaching technological improvements which have been affected in the art of generating and transmitting electric power. The average fuel conversion efficiency of our steam-electric plants has been greatly increased in recent years. In 1945, 1.30 pounds of coal were required, on the average, to produce a kilowatthour of electricity. In 1954, the figure was only 0.99 of a pound—a reduction of about 24 per cent. Our newer plants do even better than that, and Philadelphia Electric Co. now has under construction a generating plant which is expected to use only three-fifths of a pound of coal per kilowatthour of generation.

Transmission lines operating at 330,000 volts are now in use. A double circuit line of this type is estimated to have a capacity more than eight times as great as that of a double circuit 132,000-v line, which is a type now widely used.

The use of automatic substations, billing machines, computing machines, and other devices has enabled our industry to take advantage of automation in multiplying the productivity of our employees.

No other industry, I think, will be able to use automation in more places or with greater advantage than ours. For example, in 1930 the number of employees of the electric industry was 286,000; and in 1954 the number was 307,000. This comparatively small increase (less than ten per cent) occurred during a period in which the production of electricity quadrupled. This greatly increased productivity per employee permitted the industry to effect important economies while giving the employees substantial benefits in the form of higher wages and more attractive working conditions.

Atomic Research Participation

As you know, private enterprise has been permitted to participate in atomic research and development only about a year and is still under considerable burdens and restrictions, but already private enterprise, employing private funds, has plans definitely under way to construct 900,000 kilowatts of electric generating capacity using atomic materials for fuel. These developments will involve an investment of over $225 million. That our industry and its allies have committed themselves to go forward on such a scale constitutes a tribute not only to the alertness and courage of the investor-owned electric companies but also a tribute to the vigor of the whole American free enterprise system and its ability to meet any challenge. It is the best possible answer to the gloomy prophets who only a short time ago were saying that our economic and political systems had outlived their usefulness—and to the socialists and parlor pinks who still preach that only government is big enough to cope with the problems and measure up to the promises of the atomic age.

Effect on Investment

You may have felt some concern as to the possible effect of atomic developments on existing public utility investments. I do not believe there is any ground for apprehension. Atomic materials will merely serve as another source of fuel, one which is expected to lower generating costs. The portion of a modern electric power system which is likely to be affected are the

steam boilers, which represent only about 12 per cent of the plant account of the average electric utility. Even this 12 per cent is not expected to be obsoleted and written off. It will remain in service for its normal life, serving as peaking capacity even when atomic plants take over base loads. In an expanding system the 12 per cent will become a constantly diminishing fraction and will finally vanish, as I have said, only after the boilers have served their normal life.

Small Unpleasant Facts

Up to this point I have given what I hope is an accurate, if perhaps optimistic, picture of the industry to which you have contributed so much and in which you are, in a very real sense, our partners. In the interest of complete candor and fairness I am now obliged to inform you of some unpleasant facts.

I refer to the continued political activity of the advocates of socialized power. This activity has assumed different forms in different places. This is the sort of piecemeal approach the advocates of socialized power have found most advantageous in allaying suspicions and winning support. Sometimes their proposals have been advanced as modest requests for government aid in the face of underdevelopment or disaster; and sometimes under the pretense of seemingly legitimate governmental activity in the fields of interstate commerce and national defense. Their maneuverings have almost always been accompanied by noisy denials of any intention to compete with or destroy investor-owned enterprises. But, as their plans have grown in magnitude and boldness, they have inexorably crowded out or proscribed privately-financed operations as in Tennessee and Nebraska. This result has not been avoided merely because of the innocent intentions of the people in government and in business who have supported these programs.

Apathy and Timidity

To indicate the diversity of the socialized power program and the extent to which it has been aided by public and business apathy and by political timidity, I need only mention (1) the Dixon-Yates and Clark Hill episodes; (2) the recent opinion of the Attorney General of the United States construing the Preference Clause of the Flood Control Act of 1944 in such manner as to give a virtual monopoly of Federal reservoir power to cooperatives, municipalities, and other public agencies; (3) the continued harassment of electric utilities by so-called "investigative" committees of Congress such as the Chudoff, Flood Control, and the Monopoly subcommittees and others; (4) the extension of the preference principle to include the purchase of surplus power from government atomic energy installations as well as hydroelectric plants; and (5) the nation-wide campaign now shaping up to enlist support for TVA revenue-bond legislation without adequate provision for keeping financial control of this agency in the hands of Congress, and without requiring any return on or reimbursement of the public's billion-and-a-half dollar investment in TVA power facilities. In this connection, I should also mention the continued tax discriminations and other subsidies which a 20 per cent minority of our people, served by government-financed or government-operated power organizations, now enjoy at the expense of the 80 per cent served by the investor-owned utilities. This privileged class pays no Federal income tax as a part of their electric bills and little if any local taxes, whereas 23 cents of every dollar paid by the customers of our electric companies goes to the support of government. Our investors also pay income taxes on dividends and interest amounting roughly to another two cents.

Industrial Opposition

I have mentioned these discriminations against 80 per cent of the people of the United States, in favor of a privileged 20 per cent, because your interests and those of the investing public seemed to me to demand it; and also because I wanted to tell you that the electric industry is more aggressively, fearlessly and cohesively opposing these encroachments today than ever before in its history. Also the public is more aware of what is involved and therefore more ready to support us as is revealed in addresses and in editorial comments from large and small newspapers all over America.

Here are some very heartening signs:

(1) Free enterprise electricity has just won a resounding victory in Stevens County, Washington. In that area, where government power has long claimed popular support, a whopping 72 per cent majority of the voters expressed a preference for service by the Washington Water Power Co. in one of the most unique and decisive local elections ever held. The utility company and a Public Utility District had agreed that Stevens County was not big enough for both to continue. The local voters were given a clear-cut choice of selecting between the two organizations, with the understanding that, unless 60 per cent or more of them favored The Washington Water Power Co. it would sell out its facilities to the subsidized power group. President Kinsey M. Robinson and other representatives of the utility company courageously and effectively presented their side of the case to the voters. Their efforts resulted in a clear-cut victory for private enterprise, despite vigorous campaigning by the PUD, 18 Stevens County Granges, and other organizations and individuals favorable to government power. The chairman of the PUD has admitted that "We took quite a trouncing here. Evidently, it might be called a trend." Mr. Robinson declared that the vote was "a clear-cut indication that the majority of the American people anywhere will vote in favor of free enterprise, if they are only given the opportunity to do so." It is generally agreed that the outcome of this election will affect not only the vigor of the government-ownership movement in Washington State but should also influence national policy decisions in this field.

(2) The Dixon-Yates episode revealed for the first time the brazen and grasping purpose of the TVA advocates to hold on to their electric power subsidies at the expense of the rest of the nation. This was a real achievement, I think.

(3) The investor-owned electric industry has dramatically demonstrated its continuing willingness and ability to build large hydroelectric developments wherever economically justified. The Hell's Canyon proposal of the Idaho Power Co.; the Alabama Power Co.'s proposed development of the Coosa and Warrior Rivers; and the Pacific Northwest Power Co.'s proposal to construct two additional developments on the Snake River

below Hell's Canyon, together with numerous other smaller and less spectacular hydro projects, now give the lie to the claim that Federal development is necessary because private enterprise can't or won't do the job.

(4) The willingness and ability of the industry to enter into partnership arrangements with the government for hydroelectric developments on a joint participation basis has also been demonstrated by the Trinity River and John Day proposals.

(5) The tenacity and courage with which the electric companies have continued their fight to develop the Niagara Falls site has up to now, at least, prevented a give-away of that project to the subsidized power interests.

More important than any of the other hopeful signs I have mentioned, however, are the evidences of a growing willingness on the part of utility managements to stand up and fight for the rights of their companies and their customers, and an increasing public awareness of certain basic facts which have been long overlooked or else obscured in our struggle against the socialization of the electric industry.

One of the basic misconceptions now on the way to being corrected is the oft-asserted postulate that only the government should develop our waterways because they are a natural resource. Our coal and oil reserves, our iron and copper deposits, and our forests and fields are also natural resources; and whereas the electric industry uses only the energy of falling water, neither detracting from its quantity nor altering its physical characteristics, the developers of most of our other natural resources are compelled to draw upon and deplete original reserves. A public, which has no intention of seeing these other important and basic industries come under the paralyzing control of bureaucracy, is finally realizing that there is even less reason for the electric industry to be governmentalized, and that to permit it to become so means only a smoothing of the road for the ultimate socialization of all industry.

The public is also beginning to see that there are no mystical qualities of abundance or cheapness inherent in electric power from government facilities. Admiral Ben Moreell, Chairman of the Task Force on Water Resources and Power of the Hoover Commission, who I think has done more than any other person to debunk this notion, said recently:

"There is no logical reason for the popular appeal of the public power issue. Actually the cost of electric power to the average householder is about one per cent of his family budget. A reduction of only three per cent in his tax bill would pay for all of his power"; and he added: "Technically and financially there is no present nor prospective need for Federal power activities. There is no lack of ability on the part of private power to finance and install needed generating, transmission and distribution facilities . . . the construction of Federal power projects as so-called 'yardsticks' to control the rates charged by investor-owned utilities is a 'phoney.'"

(*Continued on page* 410)

Cost of Electricity for Lighting and Cost of Bread—U. S. and Foreign Countries

THE American worker labors for less time to purchase 40 kilowatthours for lighting than does his counterpart in foreign countries. A workman in the United States can purchase this amount of electricity in less than half the time that the worker in the United Kingdom requires. In some countries several days of labor are required to purchase this amount of electricity which the American worker can buy with his pay for one hour. Similarly the worker in the United States is much better off when he purchases his bread supply.

Working Time Required by 3 Classes of Workers to Buy 40 Kwhr of Electricity for Lighting or 1 Kg (2.2 lbs) of White Wheat Bread

	Carpenter		Printing Press Operator		Construction Laborer (Unskilled)	
	40 Kwhr	1 Kg Bread	40 Kwhr	1 Kg Bread	40 Kwhr	1 Kg Bread
Argentine	3 hr 29 min	15 min	3 hr 10 min	13 min	4 hr 19 min	19 min
Austria	2 hr 52 min	50 min	2 hr 19 min	40 min	.....	.....
Belgium	5 hr 22 min	17 min	5 hr 23 min	17 min	6 hr 37 min	21 min
China (Taiwan)	4 hr 17 min	1 hr 32 min	6 hr 16 min	2 hr 13 min	7 hr 52 min	2 hr 40 min
Finland	3 hr 48 min	25 min	4 hr 16 min	28 min	4 hr 28 min	30 min
Germany (Western)	4 hr 36 min	26 min	5 hr 6 min	29 min	7 hr 4 min	41 min
Greece	11 hr 24 min	50 min	13 hr 20 min	59 min	14 hr 19 min	1 hr 3 min
Iceland	1 hr 51 min	17 min	1 hr 48 min	17 min	2 hr 20 min	22 min
Italy	9 hr 26 min	46 min	6 hr 52 min	33 min	10 hr 35 min	51 min
Japan	.....	.....	6 hr 7 min	54 min	.....	.....
Netherlands	7 hr 48 min	23 min	7 hr 25 min	22 min	9 hr 37 min	29 min
Portugal	15 hr 18 min	35 min	12 hr 20 min	28 min	27 hr 5 min	1 hr 2 min
Spain	7 hr 48 min	41 min	5 hr 4 min	26 min	7 hr 48 min	41 min
Sweden	1 hr 21 min	29 min	1 hr 22 min	30 min	1 hr 25 min	31 min
Switzerland	5 hr 19 min	15 min	5 hr 11 min	14 min	6 hr 24 min	17 min
United Kingdom	1 hr 36 min	13 min	1 hr 31 min	12 min	1 hr 58 min	14 min
United States	40 min	8 min	41 min	8 min	57 min	11 min

Source: International Labour Review, July, 1955.

Modern Wiring—The Key to a Brilliant Future

By George E. Whitwell

Vice President in Charge of Sales, Philadelphia Electric Co.

An address before the Annual Convention of the Pacific Coast Electrical Association, Honolulu, Hawaii, November 10 and 11, 1955

MY SUBJECT — Modern Wiring —has become recently a matter of immediately important interest to all branches of the electrical industry. This paper will be limited, to a large extent, to a presentation of the wiring problem in homes located in the territory of but one electric utility. Emphasis will be upon existing homes with only brief reference, despite their importance, to those now being built.

My pleasant task is to pin-point one local study of and attack upon this problem. I refer to the activity during the past six months in the five-county area in southeastern Pennsylvania which is supplied electricity by the Philadelphia Electric Co.

These five counties have an area of only about 2,000 square miles and a population of more than three million.

Our activity illustrates one way in which the wiring problem may be approached under conditions reasonably representative, I think, of those to be found generally in existing homes. It is known as 100-A and calls for 100-amp service entrance and provision for a minimum of eight branch circuits.

This paper will be divided into six parts:

(1) The Philadelphia area old home rewiring problem;
(2) The promotional tools being used;
(3) The provisions for financing;
(4) The value and training of manpower;
(5) The early results; and
(6) The importance of adequate wiring in obtaining the brilliant future predicted for sales of electricity.

Philadelphia Rewiring Problem

Philadelphia is an old city, an important seaport, and the center of both long established and new highly diversified industrial and business enterprises. It has wide home ownership both within its single county limits and in the four adjacent Pennsylvania counties which constitute its suburban area. In these suburbs are other cities, boroughs, and townships containing homes of all types, rapidly growing industry, and some 12,000 farms.

Area development and public relations advertisements that Philadelphia Electric Co. has been running in such national magazines as *Saturday Evening Post* and *Time* depict worldwide trade, industrial progress, and high standards of living in the Philadelphia area.

Residential electric customers of our utility number 494,000 in the city itself and 319,000 in the suburbs for a total of something over 800,000. Despite the good, though necessarily limited, work of the National Adequate Wiring Bureau, these customers, as a whole, have known little and cared less about their electric service entrances and wiring.

Intensive Investigation

Six months of fairly intensive investigation last summer and fall convinced us that about 354,000 homes, or 44 per cent of the total, had 2-wire services; that at least 484,000, or 60 per cent, had less than our minimum service entrance requirement of 60 amperes; and that four out of five homes, or 640,000 of them, need new wiring.

In other words, our folks in the Philadelphia area are like folks everywhere else. They have had little or no interest in the unglamorous wires hidden within the walls and in the more or less mysterious service entrance equipment which they leave strictly alone until something adverse happens.

Yet the average use of residential electricity in our area has grown to more than four times that of 25 years ago when many of our present old homes were already built and wired as they still are today.

We have learned that, in only our five counties, the immediate wiring market amounts to $150 million, of which $90 million will be required for materials and $60 million for contractors' expenses and profit. Similarly, if Philadelphia and suburban distributors and dealers are to get their share of the national sales of just five major appliances in the next five years, they must sell a minimum of 450,000 units with a retail value of at least $130 million. Thus, there *can* be average annual local sales of 90,000 units of room coolers, ranges, clothes dryers, water heaters, and dishwashers, having a retail value each year of about $26 million.

These appliances have wiring requirements which are estimated to cost a total of $4 million annually or $20 million in the next five years. The total market, therefore, in but these five counties for only five major appliances and their required wiring is $30 million a year during the immediate future. Relatively, throughout the country, this same market exists.

The greatest of all electrical mass selling jobs to a reluctant and uninformed public faces the entire electrical industry. It is strange, indeed, that, until recently, there has been so little recognition of the vital role being played by wiring, or, rather, by its inadequacy. The National Adequate Wiring Bureau has been almost alone in promoting modern wiring.

Happily, we have all seen, over the past year or so, an awakening basic understanding of this wiring problem by manufacturers of all kinds of electrical equipment; by their distributors; by dealers; by contractors; by electric utilities; by financing institutions; by electrical inspectors; by home builders; by trade and shelter publications.

There have been recent national promotions by these allies of modern wiring. Their great assemblage of talent and resources is none too large, so great is the mass selling job that must be done with an apathetic public.

The Philadelphia area's share of this enormous task boils down to a

coordination of the efforts of those who are involved locally so that they may be effective in creating widespread public interest in, and then understanding of, the benefits of modern wiring.

Promotional Tools Used

Fortunately, our local representatives of all branches of the electrical industry are used to working together. Over the years, The Electrical Association of Philadelphia, now with more than 1,500 members, has been the focal point of all coordinated industry promotion and this wiring program is no exception.

It has required, since the first of this year, about 30 meetings. Of them, one was held with 358 distributor salesmen representing 42 distributors; another, with 300 electrical contractors; and a third, with over 1,000 dealers and their wives.

It has not been easy to persuade all members of our allies, both within and without the industry, that they have a priceless stake in this activity. While gratifying progress has been made in this direction, particularly with the contractors, the banks, and the inspectors, much remains to be done. To accomplish it, meetings are continuing and their end is not in sight. It will not be until mounting enthusiasm, born of understanding and justifiable self-interest, has spread its contagion much more widely.

All available advertising media have been used in the mass approach to the public. A wide variety of promotion materials have been sent to and used by electrical dealers and by electrical contractors.

Aids for Contractor Interest

There have been also aids to inspire contractor interest. These include hand-out pieces, gadgets, and other promotional devices directed to the public as helps to contractor wiring sales; wiring exhibits on our sales floors and elsewhere; a model home at The Philadelphia Home Show, and a newsletter known as "Contractors' Items," published periodically by the electric utility.

The Electrical Association has run advertisements in daily and weekly newspapers. They listed the names and addresses of 393 contractors and 146 dealers actively supporting the promotion. Philadelphia Electric Co. newspaper advertising appeared in metropolitan and suburban dailies and weeklies. Two full page ads have been run, together with a number of half-page size. The most successful of them was one which drew an analogy between inadequate wiring and the reduced water pressure resulting from too small pipe. People seemed to understand this comparison and, as a result, this story was the subject also of an attractive brochure.

Newspaper Advertising

The newspaper advertising of both the Electrical Association and the company has been voluminous. Its total circulation during the first six months of the activity has been in excess of 21,000,000.

Countless other advertising tools have been employed. Among them are direct mail, hand-out folders; door, window and panel box stickers; spot announcements on ten radio stations; television spots; outdoor signs; and films shown to business and service organizations.

This, then, is some of the advertising and promotional material used this spring and summer to reach our mass wiring market in the Philadelphia area. During the six months, March 15 to September 15 of this year, it is estimated that 500 million advertising impressions have been made.

Contractors' Activities Tie-Ins

Tie-ins with the activity by contractors have been used. Among them are a contractor's truck painted with the 100-A symbol, a contractor's office with a 100-A display, and a similar contractor's show window. Contractors' cooperating newspaper ads, builders' stories, and publicity have appeared in local papers.

The Electrical Association's program this fall includes advertising which, regardless of its nature or its subject, makes use of 100-A symbol wiring reminder. It is found also in all the advertisements appearing in the company's program this fall. It is obvious that our earlier experience has convinced us of the necessity for undiminished reiteration of the need for and value of modern home wiring. We feel that the amount of promotion used, within available resources, cannot be too great.

To maintain and stimulate contractors' interest in the 100-A wiring activity this fall, continued mailings are being made by the Electrical Association.

Likewise, a giant-size mailing piece, outlining the complete fall program to appliance dealers, emphasizes the value to them of participation in the 100-A wiring plan.

Provisions for Financing

It is well known to all who have studied or been active in this wiring matter that one of its most important facets is that of financing sales. Ways and means of accomplishing this financing vary.

Some utilities have successfully assumed this obligation in order quickly to initiate and then maintain an activity. They are confident that this practice has resulted, not only in many sales thus financed, but also in stimulating the regular financing agencies to active plowing of the wiring field. Others have left the job more or less entirely to regular financing institutions.

After many weeks of careful study of this phase of the problem and following much close contact with banks and savings and loan associations, we decided to divide the financing. We learned from our survey that most financing agencies consider a loan of less than $100 unprofitable. Consequently, Philadelphia Electric Co. has been taking and will continue indefinitely to take loans ranging in amount from $20 to $90. All larger loans are and will continue to be the exclusive responsibility of the financing agencies.

There is no doubt in our minds of the great desirability of provision for financing loans under $100. This feature is most helpful in permitting advertising of all-inclusive financing and in getting a foot in the door through small jobs, many of which are then sold up to a much more complete wiring installation.

Measuring the Value

As of the middle of September, only 565 company-financed jobs had been applied for, but this small number is far from being a measure of the value of having such financing available. For example, the regular financing agencies are very pleased with the greater number of larger jobs going to *them*.

The company's plan is known as 1-2-3 financing. These numbers mean

that monthly payments for wiring will be added to the electric bill and will, depending upon the amount of the loan, be $1, $2, or $3 per month for a period not to exceed 36 months. There is no down payment and simple interest of 6 per cent is charged. Any odd amounts are incurred only in the final installment.

Simplifies Work, Reduces Cost

The 1-2-3 feature simplifies the work and reduces the cost of accounting. We are confident that, despite the low simple interest required by Pennsylvania law, our financing will be just about self-supporting. More important, however, is the fact that it has helped greatly to produce substantial good-will toward and interest in the whole wiring program by financing institutions and by those who are the active salesmen of modern wiring.

Advertising of available financing has been directed to the public, to dealers, to contractors, and to utility employees. These employees may finance any amount up to $500 or more under special conditions. Payroll deductions with no interest charges are provided.

Favorable results of our financing policy are evidenced by the participation of others in wiring promotion. Newspaper ads have been prepared and inserted by banking institutions at their expense, and finance folders have been distributed by dealers and contractors. More than 350,000 copies of one folder have been used by a large number of banks as enclosures with their monthly bank statements. The banks paid half the cost of producing these folders and all of the cost of distribution.

Another form of promotion by banks consists of home wiring and financing displays, which are being used in the lobbies of financing agencies. All of these sales aids produce customers for profitable financing, of not only wiring, but also many appliances. Moreover, people with bank accounts have or can get money for improved wiring and it is invaluable to have the banks as well as us in the electrical industry recommending it.

Value and Training of Manpower

Although trained manpower for rewiring promotion and sales is of equal importance with mass promotion and financing facilities, I will refer to it but briefly. Let us all understand, however, that the value of manpower in a modern wiring undertaking cannot be overemphasized.

With a mass market to be reached, the necessity for trained men and women at the points of sale is often overlooked. Where many allies interested in this mass market are involved, manpower for coordination is essential.

The salesmen of modern wiring are the contractors. Dealers *can* be salesmen, too, when they are convinced of the basic importance of adequately wired homes to the volume sale of appliances.

The salesmen of appliance and equipment distributors are manpower available to sell both contractors and dealers on their great stake in the activity. The training of these and other potential salesmen, such as home builders, should take second place to no other feature of a modern wiring promotion.

Coordination Staff

In the Philadelphia area, coordination is being obtained by a staff of utility representatives employed and trained last spring for this purpose. They maintain contact with all contractors in order to keep them informed of all procedures associated with the 100-A activity and to arrange with them the reporting of all 100-A wiring installation work. Upon a customer's request, these home wiring representatives call to make recommendations for wiring changes and, if necessary, to provide the names of qualified contractors. They maintain contact with financing agencies and assist the customer, when required, in arranging for loans. They present talks and the motion picture, "The Magic Link," before groups such as women's clubs, parent-teacher associations, and civic and service clubs. They are beginning to be invited to tell the wiring story to school children. In short, these utility men coordinate and are the spark-plugs for the entire activity.

For training, special classes were held by the Electrical Association. A total of 13 organized classes was arranged. They required 31 sessions to accommodate contractors, department store personnel, dealers, and others. Total attendance was about 500.

I repeat, let no one underestimate the great necessity for trained manpower. Because of it, of unusual promotion, of adequate financing arrangements and of fine selling-up by contractors, many of them today in the Philadelphia area are so busy that they can undertake new rewiring jobs no sooner than two or three months hence! Electrical inspectors are, involuntarily, days behind in their work! Perhaps these situations will prove to be definite limiting factors to our whole program until they can be remedied.

The Early Results

It is always difficult to predict future continuing results from those obtained during the first six months of any promotional activity. It is particularly so with this one. Many agencies must be depended upon to report new 100-A wiring installations. There is a big lag, therefore, even though the coordinating group is active in contacting those who have not reported for some time. Furthermore, in this first year, there was no carry-over of unreported jobs from an earlier year.

We have adopted what we think is a legitimate method to estimate carefully and fairly a realistic annual figure, from jobs reported during the initial six months. We call it "The Estimated Continuing Annual Result." We think its use is better, even though it averages about 15 per cent higher, than to report merely the doubling of figures for a first six months' operation that started from scratch.

Continuing Annual Result

On this basis, The Estimated Continuing Annual Result of the Philadelphia Area 100-A Program, expressed in numbers of new wiring installations in conjunction with new service entrances, is 2,600 60-amp entrances; 6,000 100-amp entrances; and 25,000 branch and appliance circuits and outlets. The total 100-A continuing annual wiring improvements installed in conjunction with new service entrances therefore number about 33,600.

These wiring improvements do not include some 40,000 appliance circuits for the 1955 estimated sales and installations, unaccompanied by new service entrances in old homes, of room coolers, dryers, dishwashers, ranges, and water heaters. Nor do they include the too large number of

these five appliances, mostly room coolers, which continue to be installed without provision of adequate circuits, much less of new entrances. Nor do they include the wiring for the more than 20,000 of these five appliances estimated to be installed in *new* homes during 1955.

These exclusions merely emphasize the extreme importance of much greater progress very soon in obtaining public awareness of the need for wiring improvements in four out of five old homes and in most new ones.

The Estimated Continuing Annual Result of the Philadelphia Area 100-A Program, expressed in kilowatts of additional electrical capacity made available in 8,600 old homes through the installation of a like number of new service entrances, is 105,000 kilowatts.

For Five Major Appliances

Let us estimate the number of five major additional appliances for which 105,000 kilowatts provides electrical capacity. One possible division could be 6,000 additional water heaters, 6,600 ranges, 6,000 clothes dryers, 6,000 dishwashers, and 18,000 room coolers, or a total of 42,600 major appliances. Additional small appliances and improved lighting also will be adequately accommodated by these 8,600 new residential service entrances. Unfortunately, this added appliance and lighting load will all have to be installed in only about 1 per cent of the more than 800,000 homes we serve.

They will provide us with estimated annual revenue of about $750,000. The direct cost, excluding manpower, of our first year's promotion of modern wiring will be about $200,000. The continuing annual cost probably will be nearer $125,000.

Justified and Encouraging

We believe, therefore, that, from the point of view of additional electrical capacity for appliances provided in old homes and from that of the increasing awareness by the public, by the electrical industry, and by its allies, of the value to them of this endeavor, our activity so far is entirely justified and encouragingly resultful. The facts that only about 1 per cent of these homes is known to be providing new service entrances and that there has been as yet but a limited beneficial effect upon home builders only emphasize the size and importance of the mass selling job yet to be done.

Importance in Obtaining the Brilliant Future

What is this brilliant future that has been predicted for sales of electricity? I find the answer in forecasts[1] made in 1954 by recognized government and other economists and by qualified personnel in the electrical industry.

They obtained past and made projected future trends of the most frequently used statistical indices associated with forecasting. One of them was, of course, the trend of population increase. All of us know that population growth is the dynamic force underlying future improvement in the over-all economy of this country.

These experts then determined the trend in gross national product from 1945 through 1953 and made individual forecasts to 1959, 1964, and 1970. Gross national product is the most composite indicator of our economic worth.

The trend of disposable income through 1953 was then obtained and individual projections from then on were made. It was fascinating to observe the closeness of these estimates.

With this all too short comment on the value of these and other basic economic indices, let us see what has been found by these experts for past and future sales of electricity.

Included in the forecasts will be expected large increases in residential and rural sales. These increases can be obtained only through more widespread use of heavy-duty appliances, of better lighting and of electrical housewares in new and existing homes, and through the greater application of electricity to the farm. Outmoded wiring installations must be replaced in order to accommodate these loads.

Statistical Picture

A book could be written on the miracle growth during the recent past and on the fantastic expected increase in the commercial and industrial light and power sales of electricity in this country. Instead, Figure 1 is a statistical picture of the growth in all sales of electricity. The story of the past is contained in the shaded portion.

The future use of electricity goes up and up—until you see predicted annual sales of an astronomical trillion kilowatthours! Two out of the three estimates which extend to the year 1970 or beyond and one which does not reach that far into the

(*Continued on page* 416)

[1] A complete paper on these forecasts was presented by the author under the title of "Don't Sell Load Growth Short" to the Edison Electric Institute Transmission and Distribution Committee on February 11, 1955. This paper was printed in the March, 1955, issue of the BULLETIN.

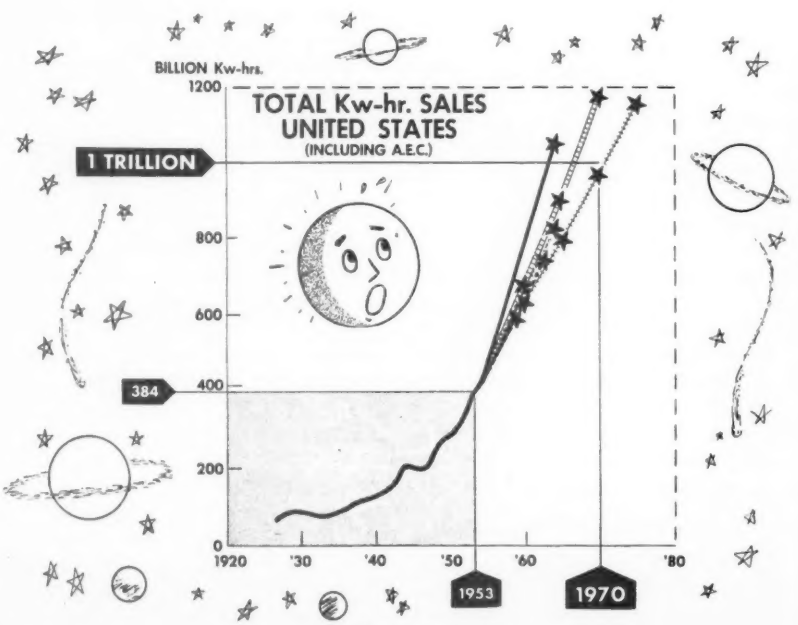

Figure 1

Consolidated Edison's Application of Electronic Computers to Accounting

At the New York State Public Utility Executives Conference, held in Thousand Islands, New York, on September 9, 1955, two executives of Consolidated Edison Co. of New York, Inc., spoke on their company's preparation for the application of high-speed electronic computers to accounting. The two papers are directed to utility accounting in the customer and general accounting field. The BULLETIN prints both papers as companion pieces.

Programming for an Electronic Computer

By J. W. Balet

Assistant Controller, Consolidated Edison Company of New York, Inc.

WHEN electronic equipment for business purposes is discussed, attention is usually centered on the physical characteristics, the performance, and the factors involved in selecting a particular type of equipment. Programming may sometimes be included in the discussion but little is said about the large amount of work that is required before an electronic computer can be applied to an accounting operation. This paper will attempt to fill some of this void.

Specified Equipment

Programming varies widely in approach and extent, depending upon the business machine that is being programmed. Consequently, in discussing the subject the kind of equipment must be specified. The present discussion is concerned with the programming of large-scale general purpose electronic computers, such as the 705-EDPM and the two UNIVACs that will be delivered to Con Edison during 1956. The company will use the UNIVACs for customer accounting and the 705-EDPM for general accounting and various other company operations.

The large-scale computer has, as its central component, a high-speed internal memory in which is stored the information to be processed and a series of instructions that will direct the computer through the operations to be performed on the information. Both the information and the instructions are moved into the computer via magnetic tape, and tape is also used for output. Peripheral equipment provides for conversion from punched cards to magnetic tape and from magnetic tape to punched cards, and for printing actuated by magnetic tape.

It is generally agreed that the large-scale computer with its peripheral equipment can duplicate punched-card operations. But beyond this, the computer has three unique characteristics that have a major effect on programming:

1. Information can be stored indefinitely on magnetic tape;
2. The computer has the ability to make comparisons; and
3. The computer can store within its memory the instructions that it will automatically follow in processing information.

Use of Magnetic Tape

The storage of information on a magnetic tape replaces punched cards and other visual forms with a record that is stored in serial order on the tape. The tape has the advantage that the record can be compressed into a small space, and much of the duplication of information that is inherent in punched card systems can be eliminated. However, the information is stored on the tape as magnetic bits, and hence is invisible.

In making comparisons, the computer matches two quantities and, depending upon whether they are equal, greater than, or less than one another, follows entirely different paths for subsequent operations. This capacity for making comparisons is generally known as the logical ability of the computer. Because of it, computer operations can be extended into clerical functions that were formerly believed to be too complex for machine methods.

The third unique characteristic of the computer, namely, the storage of instructions in its memory, makes the computer fully automatic in processing data and also permits a choice of different operations as a result of the comparisons.

Speed and Flexibility

These three characteristics — the use of magnetic tape, the ability to make comparisons, and the internally stored programs — are among the factors that give the electronic computer its high speed and tremendous flexibility. However, these same characteristics make the programming of a computer extremely difficult.

In the glossary of the Association for Computing Machinery, programming is described as the planning of:

> "A computational process from the asking of a question to the delivery of the results, including the integration of the operation into the existing system. Thus, programming consists of planning and coding, including numerical analysis, systems analysis, specification of printing formats, and any other

functions necessary to the integration of a computer in a system."

This definition is so condensed that it does not adequately describe programming to people who must organize and direct it.

To indicate the scope of programming, some of the steps involved will be described. The purpose is to outline the form that programming takes rather than to describe the process that is being programmed. For this reason, although reference is made at times to the actual programming of the Con Edison payroll for the 705-EDPM, the details of the payroll process will not be explained.

Step 1 — The Balloon Chart

The balloon chart gets its name from the circles which are used in the chart to represent magnetic tapes. A rectangle represents the computer, and arrows pointing from the circles to the rectangle mean that information is being read into the computer from magnetic tapes, while arrows pointing out represent information being read out of the computer on to tapes.

The balloon chart is the starting point of programming and is the simplest representation of a computer operation. It merely outlines the number of tape units that must be connected to the computer and presents a general picture of what information is to be processed. To a large extent, the balloon chart is the connecting link between the system design of the accounting procedure that is to be programmed and the more detailed programming that follows.

Step 2 — The Master File

The master file contains the basic information necessary for the payroll operation, such as the employee's name, his number, title, rate of pay, etc. This information is spread along a magnetic tape in serial form, the items for each employee following one another and the record of one employee being similar, except for content, to the record of any other.

The greatest possible compression of the master file is desirable for two reasons: (1) the capacity of the computer's internal memory is limited and as much of this capacity as possible should be reserved for other phases of programming; and (2) since all the information in the master file must pass through the computer, whether or not it is to be processed, the shorter the master file the less is the time required for computer operation.

The design of the master file is further complicated by the fact that the exact location on the tape of each piece of information, down to the last character, must be known and completely described by the program.

Step 3 — The Flow Chart

This diagram is variously referred to as a flow chart, a block diagram, or a logical design. It is at this point that top programming skill is required. A system design for the particular accounting procedure which is generally outlined by the balloon chart must be reduced to three basic operations of the computer: (1) arithmetic computation; (2) movement of information within the computer system; and (3) the making of comparisons. Every accounting procedure that is to be processed by the computer must be broken down into steps that will fit into these basic operations.

The flow chart of an accounting procedure is usually lengthy and involved. Every last detail of the accounting procedure must be pin-pointed and provided for. There must be no omissions, since the computer has no independent judgment and will not even indicate when a step is missing.

Step 4 — Coding

Every general purpose computer has a set of instructions which, when placed in the memory of the computer, directs the computer through the operations it is to perform. A large computer will have somewhere between 30 to 50 different instructions which cause the computer to perform several variations of each of the three basic operations: arithmetic computation, movement of information, and comparison. The writing of the individual instructions is known as coding. Coding is done from the flow chart, and the operations outlined by the chart must be fully described by the individual instructions to the computer. The number of instructions included in the complete payroll program runs into the thousands.

The ultimate test of programming is that the instructions will enable the computer to perform the specified operations. Hence, it is mandatory that the instructions of the programs be thoroughly tested on a computer before an accounting procedure can be converted to computer operation. This testing is generally known as "debugging" and is a measure of how good or bad the programming really is.

Step 5 — The Print-Out

One important aspect of programming stems from the necessity of providing visual records. The invisible information on the tape must be translated on to a printed page, either for permanence or to provide the means of ready reference to the information. The preparation for these so-called print-outs is a major task in the programming procedure. For example, the print-out of the payroll register is greatly expanded compared to that of the punched card system. Thus, much of the vital information contained in the payroll master file becomes visible and permanent.

Accompanying the programming, and part of it, is a series of related tasks. The accounting procedure must be completely analyzed, the new accounting system for the computer must be designed, procedures must be written, and forms and cards must be prepared. None of these will be discussed, but the sketchy description so far presented should indicate how difficult and laborious programming is. Yet the entire process must be done thoroughly because the success of the computer installation will depend on the skill with which the programming is done.

Payroll Preparation

The preparation of Con Edison's payroll for a 705-EDPM is an example of the amount of work involved in programming. First, it should be noted that the number of employees on a payroll does not affect the amount of programming required. This is determined almost entirely by the complexity of the payroll. Con Edison's payroll can be described as medium complex; it covers a variety of types of pay, provides for numerous deductions from gross, has fairly elaborate provisions for sick pay, and includes a widespread labor distribution. At the present time, this payroll is produced through a combined punched card and clerical operation. Punched card equipment has been part of the operation for a long time, and

by existing standards the system is highly mechanized.

Excluding the time required to train personnel in programming techniques, and the time spent in the evaluation and selection of a computer, the complete programming for the Con Edison payroll will require more than 20 man-years. This also includes the time required for procedure and analysis work. Presently, 17 employees are working full time on programming, and they are assisted by several others on a part-time basis. This group will be fully occupied with the payroll programming until some time early in 1956.

The time that was spent in training this staff has not been included because it is not solely applicable to the payroll. However, training is an important part of the over-all effort and must be taken into account. Almost four man-years were required for teaching and developing the programming techniques of the group.

Customer Accounting Programming

Con Edison is also programming its customer accounting. Thirty-two employees are programming full time, and it is expected that almost 35 man-years will be required to program completely the billing operations. The programming for customer billing includes the time required for preparing the new customer accounting system design and other related operations. In addition, this group has devoted more than five man-years to learning how to program.

Probably the first question that comes to mind on hearing of Con Edison's large programming effort is, "Where did the personnel come from to set up staffs of 17 programmers for payroll and 32 for customer accounting?" The answer is that they were recruited entirely from within the company, largely in the Controller's and Commercial Relations Department. They represent a mixture of young and older men. The older men were in the supervisory and staff categories and are people who know our accounting procedures. Many of them are familiar with punched-card operations. The younger men are either cadets or graduates of our Cadet Training Course. In addition, several of the programming staff have been recruited from the Engineering, Purchasing, and other departments of the company.

All personnel was introduced into the programming work by first sending them to one of the machine manufacturers' courses. Afterwards, their training was continued by having them do actual programming on the payroll and customer billing procedures.

Manufacturers' Programmers

In both the payroll and the customer accounting programming, the manufacturers have assigned three or four programmers to each application. The work of these people has not been included in the estimate of man-years required to program Con Edison's accounting operations. The company has greatly appreciated the assistance given by the manufacturers. But it is not unfair to say that the progress made in programming is largely the results of the company's own efforts.

Another question that may have occurred to the reader is whether any short cuts in programming have been found. Unfortunately, the report must be a negative one. It is apparent though, that as the programming staff acquires experience and skill, programming appears to be more manageable. Undoubtedly, when the next accounting operation is programmed the job can probably be done with greater facility and in less time.

Automatic Programming

There has been some recent discussion of automatic programming. The general idea of such programming is to let the computer do some of the work and so reduce the time and effort required in the preparation of a program. Whatever its future, automatic programming has not been developed to the point where it is of much immediate assistance in programming a complex accounting procedure. Also, it should be noted that the machine manufacturers who are trying to develop automatic programming admit that even if fully effective, the effort required in programming will be reduced by less than 20 per cent. However, in spite of its present limitations, the intensive work being done on automatic programming does show an awareness on the part of the manufacturers that programming is a major problem and must be simplified if the high speed computer is to have an extended market.

Another question that suggests itself is whether the programming experience of one company can be of assistance to another. The answer to this question is variable. If an accounting procedure, such as payroll, of one company is exactly the same down to the last detail as the payroll of another company, then the programming of the first company can be adopted by the second. However, even small changes between the two payrolls will greatly lessen this possibility.

Other Programmings Studied

In preparing for the application of the 705-EDPM to payroll, the programming of two industrial companies who have applied electronic computers to their payrolls was studied. Their programming was found of little help because of differences between Con Edison's payroll and theirs. In this connection, it is appropriate to note that adopting the experience of one company to another can not be done on a casual basis, but would require an extended period and the detailed help of the company whose programming was being adopted. Also, it is quite clear that unless the programming personnel of the adopting company has been highly trained, not much can be accomplished.

The general conclusions that emerge from this discussion are these:

1. Good programming is essential to the application of an electronic computer;
2. Programming an accounting procedure is a long and arduous undertaking;
3. There are no present short cuts, nor does there appear to be any immediate possibility of greatly shortening the process through automatic programming;
4. The programming of one company can not be directly used by another company, except under unusual circumstances; and
5. Because of these conditions, programming may be a serious limiting factor to the widespread use of high speed electronic computers in utility operations.

Even though difficult, programming should be kept in perspective. It is only one of many steps required before an electronic computer can be

placed in service. In addition to the programming described in this paper, the preparatory work includes:

Evaluation and selection of equipment.

Planning and construction of the physical installation.

Selection and training of personnel for programming and operating the computer.

Complete analysis of present accounting procedures.

Creation of adequate computer system designs to replace existing procedures.

Revision of routines for the remaining clerical functions.

Transfer of existing records from punched cards and other records to magnetic tape.

Development of conversion routines to change over the present operations to the computer.

Personnel questions raised by the elimination of clerical and punched card operations.

Organization re-arrangements required for efficient computer operation.

However, in spite of all these problems, those of us who are working in the application field look forward to the time when the computers will be in operation. Our anticipation is based on the expectation that the computers will reduce the cost of accounting work, and will do this work more easily, more accurately, and faster.

Accounting System Design Problems with Electronic Computers

By F. J. Porter, Jr.

Commercial Manager, Consolidated Edison Company of New York, Inc.

MOST of the literature on the use of electronic computers for basic business problems stresses the importance of programming but fails to define exactly what is meant by this term. It is used by some to refer only to the analyzing, charting, and coding of procedures and by others to include also the basic design of the accounting system to be applied to the computer. For our purposes, we shall use the first definition and will consider the problem of accounting system design as a separate and distinct operation in itself.

We do this because our experience indicates that we have underestimated the importance and difficulty of the accounting system design problem particularly in commercial operations with its many related procedures. More time and effort than we originally thought necessary is being put into this area of computer application, and I would like to tell you about some of the basic problems which we have encountered and what we have done to solve them.

Complete Rethinking

When we first started to design our accounting system for computer application, the general belief not only in our company but among others with whom we discussed it, was that a complete rethinking of the accounting problem was necessary. Computers were believed to be so different from anything we had heretofore used, that totally new concepts of accounting would be necessary to use them effectively. The more we studied the problem, however, the more we came to believe that rethinking was not only unnecessary but actually undesirable, at least in the beginning.

Time Consideration

Two reasons seemed to be important. First, the time required to do a thorough rethinking job appeared to be considerable because not only did we have to decide what we wanted to change and how, but then had to gain acceptance of completely new concepts by our organization. The savings we could make by merely adapting computers to our present procedures appeared to be sufficiently large so that we did not wish to delay their realization any longer than necessary. The additional savings from complete rethinking might not be sufficient to compensate us for the time delay in realizing them.

Lack of Experience

Second, we lacked experience with electronic equipment. We felt we ought to creep before we tried to walk. No one in the utility industry had ever used this new computer equipment for either payroll or customer accounting, and we knew there would be many knotty problems encountered in adapting our present systems without revolutionary concepts being added. Therefore, we decided not to revise our accounting systems completely, but rather chose to apply our computers to our systems as they exist today, making only such modifications as were necessary because of the inherent characteristics of computers and related equipment, and any other minor changes which were obviously desirable and easy of accomplishment.

It is our intention, once we are in operation and have acquired a little experience, to review our accounting system design carefully to see whether a thorough revision is then justified. We believe this is the better approach to the rethinking problem.

Centralization of Operations

A problem which is mentioned frequently in discussions on computer applications is the need to re-align the organizational structure of the company to obtain the greatest economy through complete centralization of operations and greatest possible volume of transactions. Fortunately, in Con Edison we were sufficiently well centralized so that little revision of organizational structure was needed. Furthermore, volume was not a problem with us either. We did encounter difficulty however, in changing some procedures affecting long established policies. For example, because of historical reasons,

we have different sick benefit deductions in two different divisions of the company. To make these alike would require the revision of the constitutions of the respective Mutual Aid Associations and might require bargaining with the union. The advantages of uniformity did not seem to justify this effort.

Practical Problems

Centralization, at least from a theoretical point of view, will produce the greatest economy under computer operation. We believe, however, that it has some practical problems which must be weighed. It may well run into resistance based on long established lines of authority and organizational sacred cows. Scheduling problems may be quite severe. Must the computer be used for payroll first to get out checks or are bills more important? When will inventory be done and will general accounting be set aside for all three? If a complete reorganization is necessary to justify the computer installation economically you may well wish to look carefully at the desirability of adopting computers at all.

Under digital computer operation, the basic accounting records, of course, are retained on magnetic tape. These are the customer history file in customer accounting and the payroll roster file in payroll. A very fundamental problem encountered early in designing the accounting system is the format of these basic files. What data is to be retained in the file? How many digits or characters of file space per customer or per employee are needed? In what order will data be organized within the file? Will space be provided on every account for every possible condition or will some method of varying the size of the record with the customer or employee be adopted?

Months of Study

These are not easy questions to answer. Only after months of study, have we now arrived at a firm determination of many of them and if we have the same experience as did another utility working on this same problem, we shall be making minor changes in the organization of our history files almost up to the time of initial operation.

There are several basic considerations which must be weighed carefully in solving this problem. Unfortunately they are somewhat conflicting. First, the less information a file contains the lower will be the cost of computer operation, because these costs in many respects are in direct relation to the size of the master file. On the other hand, these files should contain all the data necessary to carry on many of our business operations, such as preparing bills and pay statements, collecting amounts due, answering questions, and maintaining the many records and reports needed by management or required by governmental agencies.

The Proper Balance

The balancing of this cost factor against the desirability of data calls for thought and careful judgment. Further experience may enable us to reduce this to more of a formula than we have been able to develop so far, but at the moment we are depending on our own best judgment for obtaining the proper balance. Our general guide has been to lean in the direction of too much data rather than too little in the beginning, feeling that we could eliminate unneeded data easier than we could establish it later when basic records may be no longer available. We also felt that it would be easier for our organization to adjust to computer operation if it had all the data now supplied than if we asked it to get along with less.

General Pattern

The general pattern we have established calls for a maximum of about 500 characters per employee on the payroll roster file tape and an average of the same for each customer on the customer history file tape. Actually each single service customer will have a minimum of 360 characters and a combination service customer 600 characters. Additional characters will be needed on the small percentage of credit risks, mailing addresses, budget accounts, and so on. We hope to be able to reduce these quantities when we review our system design later on.

A question closely related to the size of the history file is the frequency with which this file is brought up to date. This is more of a customer accounting problem than payroll as the payroll roster file needs no up-dating between pay periods. Up-dating the customer history file is done by posting cash, meter readings, changes in account data, adjustments and so forth. Cost enters very clearly into the picture. The file maintenance run takes about one-third of the computer time in customer accounting. It is therefore obvious that any material reduction in the frequency of file maintenance will directly affect the amount of work the computer will be required to turn out and hence the cost. Again the need for carrying on normal business transactions must be balanced against cost. From a pure accounting standpoint, it is not necessary to up-date the master file any oftener than once each billing cycle. With bimonthly billing this means only once every two months. Obviously however, this is not frequently enough to give us the information to answer questions and to carry out an effective collection system. So we must decide how frequently we will up-date to give minimum cost and maximum data access.

Customer History Files

In Con Edison we have decided to up-date our customer history file every seven working days, principally because we have a 42 day billing cycle and every seven days gives us six updatings per cycle. Two other utilities we know of have decided on a five day cycle because their meter reading schedules are based on 40 days. If experience proves it desirable, we could adopt a six day up-dating cycle with seven workings of the master file per bimonthly period. On the other hand we could use 14 days if we desired. We feel however, that the seven day cycle is as far as we care to go in the initial installation. It provides a rather convenient collection schedule with a minimum of manual look-up and a maximum of mechanical preparation of data. It does not delay billing of skipped readings and final bills too long, yet is reasonably economical of computer time. It may well be that this will be one of the areas which will need to be re-examined in the light of experience.

It seems quite clear, however, that no longer is customer information and credit and collection data a mere by-product of the accounting system and therefore available at the in-

cremental cost of reading it off ledgers or meter books. The supplying of these data is now a measurable and appreciable cost. The accountant now can definitely say to the credit and collection man or the customer relations man that he will retain for their use almost anything they want and give it to them in any form they want if they are willing to pay for it. They must understand, however, that much of it now is maintained for their use alone and not for the needs of the accounting system. This should cause the collection and complaint handling executives to re-examine their requirements in order to justify the costs which the accountants indicate as being incurred by them for this purpose. This undoubtedly will be one of the areas where careful evaluation will show that the cost of obtaining some pieces of information now thought vitally necessary, will not be justified.

A Middle Course

Again in Con Edison we have tried to steer a middle course by providing practically everything available now on as reasonable a time basis as we can. This too is a matter of judgment and only time will tell us how good it has been.

Once we have decided what information to keep in our customer history file and how often it is to be corrected, we must then decide how we will make this information permanently and visually available. Data on magnetic tape is invisible and so far no electronic techniques have been developed which can economically perform a random search of magnetic tape.

Periodic Print-Outs

In Con Edison we decided to make periodic print-outs of the complete customer history file so that information clerks, auditors, and others can refer to data visually. These print-outs will be of two types. First will be a complete printing of the master file once each billing cycle. Second, will be the interim printing of all postings to the master file such as, journal vouchers, turn-ons and turn-offs, cash receipts and so on. By reference to the master file print-out, plus the changes accumulated since that print-out, the information clerk will be able to answer practically any question now answerable from our punch card and meter book data. As there will be a maximum of six accumulated print-outs (one at the time of each up-dating of the master file) and the bimonthly reproduction of the master file, the information clerk will have to look in seven places at the most, the average of course being between three and four. Inasmuch as the customer history file will contain a full year's data, the retention of one print-out a year will permit us to have a complete historical record of the account.

High-Speed Printing

It is this print-out requirement which has caused many of us to desire high speed printing devices. For our reports and other normal printing requirements, conventional speeds are adequate but when we are confronted with the need for printing large quantities of data daily, we feel we must have greater speed. In Con Edison's case, print-out will amount to nearly 650,000 120 character lines per day. Conventional equipment is too slow and two expensive for such volumes.

Closely allied to the problem of print-outs is the design of the equipment and organization which is to handle the supply of information from them. For the lack of a better term we are calling them "Information Stations." Each station will be manned by a group of information personnel who can be reached by telephone by anyone in the organization. It will be the responsibility of these information people to supply data from the print-outs when required. In addition, they will review all incoming documents such as turn-on orders, turn-off orders, journal vouchers, bookkeepers orders, etc., to verify data and correct any errors before they are prepared for transfer to magnetic tape. The initial accuracy of the data on tape is vitally important to the proper operation of an electronic system and we are going to some lengths to approach as close to 100 per cent as possible.

Information Stations

Each information station will have a fixed number of accounts and a normal personnel. The accounts can be set up on any basis and in any number desired so long as it is easy to locate the proper station and proper ledger. We expect to have about 63,000 accounts handled by three information clerks per information station. Each station will receive the data from one reel of tape each day. Accounts will be assigned on a cross section basis so that each station covers all parts of a borough. Experience may cause us to modify this plan but it seems to be the most practical at this moment.

Other Design Problems

It would be possible to continue for a long time discussing other system design problems. The sequencing of changes for posting to the master file is a subject by itself. What is the order in which a piece of cash, a journal voucher, and a change of mailing address should be posted to the master file on the same account? We have 60 or 70 different types of such changes and they can occur in almost any combination. How much provision should be made for the inclusion of all meter and deposit data, thus eliminating duplication of files within the company? How will proper revenue controls be handled, ledgers trial balanced, and meter controls maintained? Will we sort data on the computer or use conventional equipment or both? Can we reduce the amount of input keypunching by some form of pre-punched output on errors, investigation orders, etc.? Time limitations obviously prevent further discussion of these problems so we shall close with just one or two comments.

Programming and Design

The first has to do with the interrelationship of programming and accounting system design. This is the old question of which comes first, the hen or the egg. Obviously a procedure cannot be analyzed, charted, and coded until we know what it is. On the other hand, design of the system must have some relationship to the characteristics of the equipment available. In Con Edison we feel that programming and system design go hand in hand. Although the magnitude of the commercial relations problem has caused us to use different groups of people for programming and system design, we are requiring that our staff working on system design be trained programmers. We also expect the pro-

(*Continued on page* 416)

Utility Problems Within Highway Rights-of-Way*

By John W. Anderson

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THE topic "Utility Problems Within Highway Rights-of-Way," is indeed a broad one. A number of problems come to mind which might be discussed; however, it is deemed desirable to limit this presentation to a discussion of two major problems, which, I believe, are important both to utilities and to those responsible for highway development. As a matter of fact, perhaps I am wrong in suggesting a distinction between utilities and those responsible for highways, because the utility is certainly vitally concerned with our roadsides and, therefore, should be included in any category of "those interested in highway development."

Two Major Problems

These two problems are: (1) Relocation of utility facilities because of highway construction and reconstruction; and (2) Tree conditions along streets and highways.

From the utility angle, both of these problems relate to economic factors. In addition to huge sums of money, both involve the expenditure of manpower, which is frequently in short supply. Further, the first problem—that of relocation—requires the use of much material also often in critical supply and frequently obsoletes much utility construction with many years of useful life remaining. The second problem—that of trees—relates to continuity of the utility's service, an element just as important as economic considerations.

Perhaps before discussing these problems in greater detail, it might be well to think again about the fundamental purpose of a street or highway. A street or highway is fundamentally an avenue of transportation for services required by the public, both those who occupy frontage along it and those more distant who may be reached by its use. There has been no fundamental change in this concept over the centuries. In the beginning the trail was an avenue for couriers, principally for communication. Later, these trails were further developed and extended and became avenues, not only for communication, but also for the transportation of people and goods.

Now our highways are avenues of mass transportation, not only for public carriers and private vehicles, but also for the services required by our population; these services include communication (now by electrical means); water, sewer, and gas mains, and their service laterals; and, of course, electric energy. Transportation facilities for electric energy and for other utility services on the highways is as much a normal use of highways as their use by the post office truck in delivering mail, or by the trash collector in removing refuse from abutting premises.

As our standard of living has developed, the public has demanded more and more of these services and insisted on their better quality. Likewise, the requirements of national defense have become important factors; hence, more and more utility construction and more and more highway construction and reconstruction.

The utilities recognize their responsibility as a user of our streets and highways. They want to be good citizens and good neighbors and want to cooperate fully in any plans for civic betterment, including, of course, programs for highway development.

Relocation of Utility Facilities

The extent of utility problems with respect to highway construction and reconstruction might best be indicated by a review of some of the data in the report entitled "Public Utility Relocation Incident to Highway Improvement." (House Document No. 127, 84th Congress, First Session.) The Bureau of Roads has accomplished a monumental task in collecting and analyzing the tremendous volume of data required for the study.

House Document No. 127 covers a total of 40,027 miles of highway construction reported on for the year 1953. Utility reconstruction was required on projects involving 13,868 miles of highway (34.6 per cent of total mileage), with expenditures of $35,530,833 excluding the cost of betterment. This figure must apparently be increased by approximately $7,500,000 representing expenditures by the states for relocating municipally-owned utilities (principally water and sewer) as incidental to highway projects. Thus the total cost of utility relocation was about $43,000,000. It must be remembered that all money spent by utilities for relocation of presently adequate facilities represents an extra expenditure for physical plant, which produces neither an increase in plant capacity nor an increase in revenue to carry the additional investment. It is self-evident that expenditures of this magnitude and this kind require careful scrutiny.

Costs Summarization

Table I summarizes utility relocation costs totaling $35,530,833 by classes of highway, mileage, and cost per mile. The significance of the average unit costs will be discussed later.

If we further summarize these figures, we find that expressways and other divided highways, accounting for only 1,765 miles or 4.4 per cent of the total highway mileage, required utility relocation costs of $17,421,884, or 49 per cent of the total. Summarizing still further, we find that expressways and other divided highways in urban areas, involving only 485 miles or 1.2 per cent of total mileage, involved relocation costs of $12,873,792, or 36.2 per cent of the total. These relationships are shown in Table II, which gives the distribu-

* Presented before the 14th Short Course on Roadside Development at Columbus, Ohio, October 5, 1955.

tion of utility relocation costs on a percentage basis between the two general classes of highways as developed in urban and rural areas.

Perhaps the most significant revelation in the report is the extremely high cost with which utilities of all classes are burdened by the construction of expressways and dual lane highways in urban areas.

However, even the relationships developed in Table II do not fully illustrate the extent of the utility burden for relocation costs, as can be shown by consideration of the relocation costs per mile shown in Table I. Although the report states that utility relocation was involved in only 34.6 per cent of the total construction, nevertheless "relocation cost per mile" has been developed on the basis of *total* highway mileage, irrespective of whether utility relocation was involved for the entire mileage or only for some portion of it. Highway construction nationally covers a wide range of conditions—from desert locations to the heaviest congested urban areas, and it is obvious that utility relocation costs must range from nothing per mile to figures substantially in excess of those shown. Thus, except for the few instances where only a few miles of highway are involved, the "utility relocation costs per mile" shown in the report are mathematical concepts only and do not reflect the astronomical costs sometimes incurred. In Table 20 the report recognizes the distinction between relocation costs per mile for the total mileage, and for the limited mileage where relocation was involved; there the "utility relocation costs per mile" are stated on the two bases for *all* types of highway as $888 and $2,562 respectively.

As a further illustration, the report indicates a figure for utility relocation costs of $38,767 per mile for Federal-aid primary expressways in urban areas. This figure may be compared to relocation costs in excess of $300,000 per mile in connection with an expressway over and along existing streets and parkways for a distance of two miles in Philadelphia.

Although House Document No. 127 leads to an inadequate conception of utility relocation costs per mile, it is nevertheless the most comprehensive summary of the problem thus far available. Its discussion here will have served the present purpose if it adequately emphasizes the tremendous burden relocation costs impose on all utilities.

Further development of pending Federal plans for Federal-aid highways is likely to result in substantial further increases in this burden.

Another phase of utility relocation costs that is often lost sight of but

TABLE I—UTILITY RELOCATION COSTS—1953

		Miles	Utility Relocation Costs Total	Utility Relocation Costs Per Mile (x)
EXPRESSWAY				
Urban	Federal aid primary	192	$7,443,240	$38,767
	Federal aid secondary	2	54,545	27,272
	Other state primary	9	139,894	15,544
	Other state secondary	3	40,044	13,348
	Total	*206*	*7,677,723*	*37,270*
Rural	Federal aid primary	509	1,945,129	3,821
	Federal aid secondary	10	11,119	1,120
	Other state primary	18	139,170	7,732
	Other state secondary	None	None	None
	Total	*537*	*2,095,418*	*3,902*
	Total—Urban and Rural	*743*	*$9,773,141*	*$13,154*
DIVIDED HIGHWAY OTHER THAN EXPRESSWAY				
Urban	Federal aid primary	268	$4,694,842	$17,518
	Federal aid secondary	6	393,085	65,514
	Other state primary	5	108,142	21,628
	Other state secondary	None	None	None
	Total	*279*	*5,196,069*	*17,978*
Rural	Federal aid primary	657	1,658,378	2,524
	Federal aid secondary	46	174,620	3,796
	Other state primary	40	619,676	15,492
	Other state secondary	None	None	None
	Total	*743*	*2,452,674*	*3,301*
	Total—Urban and Rural	*1,022*	*$7,648,743*	*$7,484*
UNDIVIDED HIGHWAY OTHER THAN EXPRESSWAY				
Urban	Federal aid primary	610	$2,822,417	$4,627
	Federal aid secondary	146	438,487	3,003
	Other state primary	73	397,362	5,443
	Other state secondary	201	445,394	2,216
	Total	*1,030*	*4,103,660*	*3,984*
Rural	Federal aid primary	13,628	6,970,190	511
	Federal aid secondary	20,114	5,181,161	258
	Other state primary	945	1,355,927	1,435
	Other state secondary	2,545	497,931	196
	Total	*37,232*	*14,005,209*	*376*
	Total—Urban and Rural	*38,262*	*$18,108,949*	*$ 473*
TOTAL—ALL HIGHWAYS		*40,027*	*$35,530,833*	*$ 888 (y)*

(x) Based on total mileage of highway improvement regardless of whether utility relocation was involved in all projects.
(y) This figure becomes $2562 when based on utility relocation costs for the highway mileage involving utility relocation.
SOURCE: Table 21—House Document No. 127, 84th Congress, 1st Session.

TABLE II—DISTRIBUTION OF UTILITY RELOCATION COSTS

	Percentage of Mileage	Percentage of Relocation Cost
EXPRESSWAYS AND DIVIDED HIGHWAYS		
Urban	1.2	36.2
Rural	3.2	12.8
Total	*4.4*	*49.0*
ALL OTHER HIGHWAYS		
Urban	2.6	11.5
Rural	93.0	39.5
Total	*95.6*	*51.0*
TOTAL	100.0% 40,027 miles	100.0% $35,530,833

contributes materially to the expense involved, is the fact that with the construction of divided highways on wide rights-of-way, the utility is forced to replace rather simple facilities with much more extensive construction. For example, the construction of a clover-leaf may result in the replacement of simple crossing construction with new facilities over a round-about route, or the installation of new underground construction, or both. Also, where formerly one line was able to serve customers on both sides of the highway, the construction of a dual highway may require two parallel lines to reach the same customers.

Physical Factors Involved

Not only does highway construction have an important effect on the utility financially, but physical factors are also involved. In many cases, rights-of-way dimensions are a minimum for proposed construction, thus making a major problem of finding space even for overhead utility facilities. The physical squeeze is particularly a problem in urban areas where space limitations frequently impose major difficulties in finding room for utility underground structures — sewer, water, and gas mains, their service laterals and access holes, together with electric conduit and manholes for communication and power services.

We have all learned that solutions to common problems can be found where each party at interest understands and respects the other's problems. Generally compromises can be reached to the advantage of all without material effect on the usefulness of the project at hand. Perhaps the situation mentioned here could be helped in a material degree were highway designers and constructors and their counterparts in the utilities to sit down more often and discuss their problems. Although cooperation between these groups is and has been a normal function, it is believed that greater cooperation is not only desirable but essential. The result could well be a reduced burden on both, as well as an earlier completion date for the project.

Such cooperation could well be applied not only to the large and expensive projects, but also to the small highway improvement projects, of which there must be countless thousands across the country in the course of a year. The widening of a street for a block or so, an increase in curb radius, the relocation of a sewer inlet, are examples of what I have in mind that frequently involve some expense to the utility. Discussion of these jobs may result in modifications that can result in savings of a few hundred dollars or a few thousand dollars on a job. If these small savings per job were to be multiplied by the myriads of jobs occurring in a year throughout the country, an important total will be achieved and perhaps less overall expenditures made without materially reducing the value of the project to highway users.

Reimbursement for Relocation

Discussion of this topic would not be complete without mention of reimbursement of utilities for relocation expenditures where Federal-aid highway projects are concerned. Relocation costs of municipally-owned public utilities, particularly water and sewer, are automatically included in many instances as incidental to highway reconstruction costs. Federal-aid highways are built for national defense, for commerce, for convenience of the traveling public; in a word, for the benefit of all the citizens of the nation. It is only equitable therefore that Federal-aid funds should cover all elements of highway costs, including utility relocation, rather than to have these relocation costs placed as an extra burden on the users of utility services.

The Tree Problem

At the Thirteenth Short Course on Roadside Development last year, E. H. Scanlon presented a paper entitled "Tailored Trees for Highway Use." In his paper, Mr. Scanlon stated, "At long last the philosophy that streets should be landscaped and not planted forest style, is beginning to flourish." I hope that I can now lend emphasis to this philosophy and hasten the day when it is generally accepted.

The current tree problem is one that at one time or another leaves practically everyone unhappy. Figures 1 and 2 illustrate my meaning. These show a street tree in Philadelphia which is higher than the 3½-story house the width of the sidewalk away. I doubt if the occupant of the house gets much sunlight and I doubt if he cares to hear the tree limbs rubbing against the windows. But even though he views these factors with equanimity, I feel sure he will have a strong feeling about a municipal order to repair his curb and sidewalk. The curb is practically non-existent at the foot of the tree and the sidewalk is a distinct pedestrian hazard. I have no knowledge that the tree is blocking a sewer lateral, but it might well be—and, if so, the sewer department, both those responsible for the mains and laterals and those responsible for treatment at the disposal plant, will be unhappy. And, if the lean of the tree means anything, perhaps the street department will be unhappy after the next heavy windstorm because of the necessity of spending time and money to remove

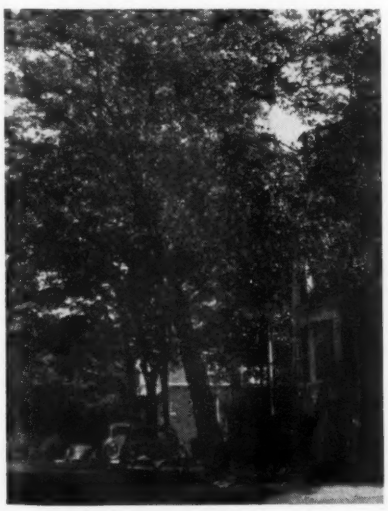


Figure 1

Figure 2

the debris. Fortunately in this particular location, utility overhead lines are not involved.

To get very close to home, the utilities are thoroughly unhappy about the tangle of trees and wires in Figure 3. Certainly the utility customers now without service — dependent as they are on electric service for the necessities of modern living—are thoroughly unhappy. And both the utility and the municipality face a stiff expense in clearing up the mess.

Nationwide Duplication

Of course, nationwide, these pictures could be duplicated thousands of times.

I think it is evident that all of us engaged in the business of serving the public—regardless of what our immediate responsibilities are—have a most important joint responsibility in the tree problem.

I have no figures on the cost nationally to municipalities and property owners for normal day-in-day-out maintenance and removal of trees, and repair of damage to sewers, curbs, and sidewalks caused by trees. Nor do I know the total cost to the more than 200 political subdivisions served by the Philadelphia Electric Co. in restoring normal highway conditions last fall after the disruptions caused by Hurricane Hazel. One municipality reported this cost at $100,000; over the entire territory, this sum must have been multiplied several times.

Tree-Trimming Costs

Neither do I have any national figures on utility costs for tree trimming. I have heard figures of $100,000,000 annually and higher. Utilities in tree areas who experience tornadoes, hurricanes, sleet storms, etc., will tell you that 90 per cent to 95 per cent of their troubles resulting in service interruptions to their customers can be traced to tree damage of their facilities as a result of storms. Tremendous sums must be spent for service restoration, but equally important, all classes of customers suffer severe inconveniences and losses by being deprived of an essential service.

I can, however, illustrate the point from Philadelphia Electric Co. experience. In recent years the Philadelphia Electric Co. has spent in excess of $1,000,000 annually for tree care, a most important item in the annual operating budget, every item of which must be carefully scrutinized as to its necessity. But in spite of this year-in-year-out activity, last fall's Hurricane Hazel resulted in service outages to nearly 400,000 customers for periods up to several days and, in addition, an expenditure of about $2,000,000 was required to re-establish normal operating conditions.

Figure 3

An Intolerable Situation

This is a situation which cannot be tolerated if there is a reasonable alternative. The reasonable alternative seems to be available in the philosophy mentioned last year by Mr. Scanlon. Suppose that 25 or 50 years ago, small trees suited to the restricted street space had been planted instead of the large trees shown in the pictures. It is easy to imagine the long-term benefits.

This situation must be considered on the basis that overhead lines, both communication and power, will continue to occupy our streets and highways. Many times the question is raised, "Why not put all these facilities underground?" Briefly, underground construction costs several times more than equivalent overhead construction, which increased costs must be borne by the utilities' rate payers. Further, underground lines are not, as commonly supposed, free from service interruptions, and repairs require considerably longer than overhead construction.

This problem has been studied very thoroughly by public bodies who have concluded, in the words of a committee appointed by one of the State Public Utilities Commissions, that the placement of all facilities underground is "wholly impractical and economically unfeasible." It is impossible to discuss this point fully in a paper of this kind, and I refer the reader to a paper entitled "Why Overhead Lines" by G. E. Dean of the Public Service Electric and Gas Co. Mr. Dean's paper was presented at the First Street Tree and Utility Conference in Cleveland, March 3 and 4, 1955.

Street Tree Utility Conference

A further word about the First Street Tree and Utility Conference. Nearly 300 people attended, representing a national cross-section of many groups interested in trees, utilities' overhead wires, and street lighting. In an atmosphere of mutual understanding, the groundwork was laid for a cooperative long-range solution of the tree problem through the use of trees adapted to their environment. Certainly this is the common sense solution. Many suitable tree species have been developed and more are to come—trees that beautify the high-

way with their blossoms, their foliage summer and fall, their variety of shapes; which during their life will minimize sewer, curb, and sidewalk problems, and which, when they become obsolete through highway reconstruction or expiration of life cycle, will not impose heavy expenditures for their removal. Likewise, their limited height will minimize utility tree care costs, and, just as importantly, minimize service hazards when storm catastrophes occur.

Chart Summarization

If the minutes of the Conference had to be summarized on a single page, nothing would serve the purpose better than the chart shown here as Figure 4. This chart is reproduced from the Conference paper entitled "Power Line Design for Compatibility with Trees," by E. V. Sayles of the Consumers Power Co. Looking upon shade trees, utilities' lines, and street lighting as three equally important public services to be rendered on our roadsides, Mr. Sayles shows the similarity of the considerations involved in each service. I shall make no attempt at a detailed description of the chart—it speaks for itself.

Proceedings Commended

I also commend for earnest study the full Proceedings of the Conference just now being published under the title of the Conference keynote: Our Streets Can Be Beautiful—And Useful. These proceedings may be had at nominal cost from any of the three organizations which sponsored the Conference, the Edison Electric Institute, the Illuminating Engineering Society, and the National Shade Tree Conference.

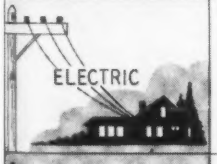
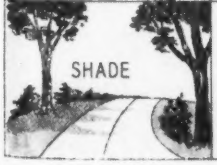
This document is a handbook of basic information on the design and co-ordination of trees and other service facilities required on American streetsides. It is important to chief executives of all political subdivisions; to municipal department heads, councilmen, burgesses, commissioners, etc.; park officials; engineers in charge of street and highway construction and maintenance; city and highway planners; housing and real estate subdivision developers; foresters; arborists; nurserymen; landscape architects; executives and engineers of electric and telephone utilities; street lighting executives, engineers, and salesmen. What I am really saying is: these Proceedings are important to everyone concerned with roadside development.

Cooperative Action

Here again the solution of a problem lies in cooperative action. May I repeat: *Our Streets Can Be Beautiful —And Useful.*

This discussion of two "Utility Problems Within Highway Rights-of-Way" has of necessity been brief and perhaps sketchy. In these as in other areas of possible conflict, I believe the best answer lies in frank discussion of mutual problems. With greater cooperation, I feel certain that we can find ways and means of producing minimum over-all costs for the projects in which we are mutually interested, and at the same time fulfill fully our responsibilities to our nation and to the public whom we all serve.

AN ANALYSIS OF FACTORS AFFECTING TREES AND SUPPLY LINES

COMPONENT FACTORS / KIND OF SERVICE	QUALITY OF SERVICE (is measured by)	TYPE OF FACILITY INSTALLED (which includes)	MANNER OF INSTALLATION (which requires)	INVESTMENT IN FACILITIES (which)	COST TO THE RESIDENT (is reflected in)
 ELECTRIC	Continuity of service and Capacity of facilities	Basic supply pattern and Mechanical strength	Clearance from trees and traffic	Tends to increase with greater clearances	Charge for service
STREET LIGHT	Continuity of service and Intensity of Illumination	Basic supply pattern and Mechanical strength	Clearance from trees and traffic	Tends to increase with greater clearances	Taxes levied
 SHADE	Amount of shade (Beauty)	Size and shape and Location	Clearance from lines and traffic	Tends to decrease with lesser height	Investment made

DEPENDS UPON THE → AND ALSO ITS → WHICH DETERMINE THE → AND CONSEQUENTLY THE

Figure 4

The Credit Picture

Results of Survey Conducted under Joint Supervision of the Credit and Collection Committees, EEI Accounting Division and AGA Accounting Section

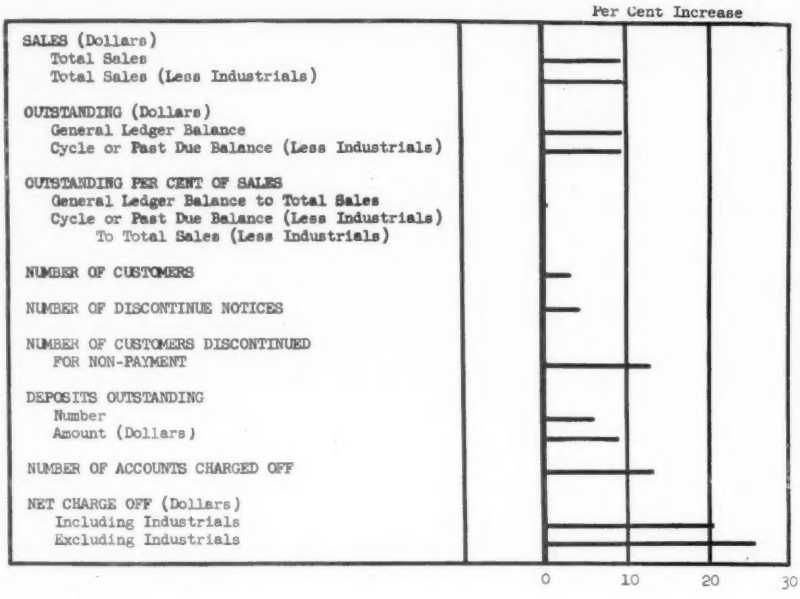
THE Credit Picture for the first six months of 1955 compared to last year presents a mixed picture of collection results, not only in respect to the principal geographical areas, but the individual company reports as well.

The over-all increase of 20.4 per cent in net charge off to uncollectibles continues the rising trend in evidence since 1948, but the rate of increase is moderately lower than in four of the five preceding semi-annual periods. On a geographical basis we find five areas showing increases over last year ranging from 20 per cent to 46 per cent, two areas in which the increase was only 4 per cent each, and two areas where decreases were registered of 4 per cent and 10 per cent. Similarly, 75 per cent of the company reports revealed higher losses than last year, while only 25 per cent reported lower losses. About one-third of the company increases ranged from 50 per cent to more than 100 per cent greater losses than last year.

In regard to the increases in sales, accounts receivable outstanding, and growth in customers, these indices are up but show only narrow fluctuations over the past three years. This relative stability, however, emphasizes that the higher percentage of net

(*Continued on page* 413)

CREDIT AND COLLECTION EXPERIENCE OF U. S. ELECTRIC AND GAS INDUSTRIES
January 1, 1955-June 30, 1955, compared with same period for 1954



PER CENT INCREASE—SIX MONTHS ENDED JUNE 30 OVER CORRESPONDING PERIOD—PREVIOUS YEAR
Three Year Summary

	1953	1954	1955
Number of Discontinue Notices	+ 1.0%	+12.9%	+ 4.9%
Customers Disconnected for Non-Payment	+ 3.1	+33.9	+13.3
Deposits Outstanding—Dollars	+ 5.9	+ 6.2	+ 8.6
Number of Accounts Charged Off	+ 9.2	+17.4	+13.7
Net Charge Off—Dollars	+14.6	+34.3	+20.4

REFLECTION OF THE CREDIT AND COLLECTION EXPERIENCE OF THE UNITED STATES ELECTRIC AND GAS UTILITIES—JANUARY 1, 1955, TO JUNE 30, 1955
Per Cent—Increase or Decrease over Corresponding Period—1954

	New England	Middle Atlantic	East North Central	West North Central	South* Atlantic	East South Central	West South Central	Mountain	Pacific	Total United States
Sales in Dollars:										
Total Sales	+ 5.1	+ 5.5	+ 8.6	+ 9.6	+10.5	+ 7.3	+11.0	+17.7	+15.4	+ 9.4
Total Sales (Excluding Industrials)	+ 4.8	+ 7.5	+ 7.1	+11.9	+ 9.4	+ 8.3	+14.4	+22.4	+16.8	+ 9.8
Outstanding in Dollars:										
General Ledger Balance	+ 3.3	+ 0.5	+15.9	+ 6.4	+ 9.1	+ 0.4	+ 8.4	+20.7	+13.2	+ 9.5
*Cycle or Past Due Balance (Excluding Industrials)	—	—	—	—	—	—	—	—	—	+ 9.3
Outstanding Per Cent of Sales:										
General Ledger Balance to Total Sales	− 1.7	− 4.7	+ 6.7	− 2.9	− 1.0	− 6.5	− 2.4	+ 2.5	− 2.0	+ 0.2
*Cycle or Past Due Balance (Excluding Industrials)	—	—	—	—	—	—	—	—	—	+ 0.0
Number of Customers	+ 1.4	+ 1.2	+ 2.5	+ 3.0	+ 4.8	+ 4.7	+ 3.7	+ 5.3	+ 7.1	+ 3.5
Number of Discontinue Notices	+16.7	+ 4.9	+10.1	+12.7	− 6.0	− 4.2	+ 3.6	+17.6	+ 7.7	+ 4.9
Number of Customers Disconnected for Non-Payment	+ 2.4	+ 8.3	+16.6	+19.4	+19.6	+18.5	+ 7.2	+29.8	+16.7	+13.3
Deposits Outstanding:										
*Number	—	—	—	—	—	—	—	—	—	+ 6.3
Amount (Dollars)	+ 2.5	+ 9.7	+13.4	+10.9	+11.3	− 4.3	+ 4.2	+10.0	+17.0	+ 8.6
Number of Accounts Charged Off	+27.3	+ 9.5	+27.8	+15.0	+19.0	− 4.5	+ 0.2	+60.3	+ 5.6	+13.7
Net Charge Off in Dollars:										
Net Charge Off (Total)	+42.4	+19.7	+45.6	+35.3	+33.8	+ 4.4	+ 3.9	−10.1	− 4.0	+20.4
*Total Charge Off (Less Industrials)	—	—	—	—	—	—	—	—	—	+25.4

* Geographical results not included due to insufficient representation.

Heat Pump Promotional Activities

Based on Results of 1955 EEI Heat Pump Survey*

THE 1955 EEI Heat Pump Survey was initiated early in April when questionnaires were sent to commercial executives of 166 electric utility companies.

Replies to the questionnaires were made by 129 of these companies who reported a total of 2622 heat pump installations in their service areas. Residential installations totaled 1614, commercial 991, and industrial 17.

Sixty-eight companies of those reporting either have definite promotional programs in operation or planned. Forty-six have reported definite promotional programs; 16 indicated they plan to promote the heat pump; and six companies plan to carry out investigations with experimental installations before making definite programs.

Sales quotas for 1955 were reported in various ways; 405 heat pump installations are planned by eight companies while five other companies report 542 "units." Two companies plan to install 3377 "tons" during 1955.

The survey requested that information on heat pump installations be broken down into numbers of installations by heat source type and state location. Table I presents the data as received on a state distribution by type of installation. Table II is a breakdown of the installations which were reported by type of heat source. Figure I represents geographically the areas with definite heat pump promotional programs, according to the submitted information, and is included to give the reader a visual idea of the areas in which heat pump activity is being carried on by electric utility companies.

In some cases electric resistance elements have been added to the heat pump unit to take care of heating demands at low temperatures at which the capacity of a heat pump may be inadequate. The survey indicated that 914 installations included resistance elements ranging between 1 kw and 16 kw. Of the 2605 space conditioning installations (excluding industrial installations), this would indicate that 35 per cent of the heat pump installations reported included supplemental resistance heating.

Companies With Definite Promotional Programs

The heat pump promotional activities, and in some instances, the sales quotas, of 46 reporting companies, are summarized below:

Company 1. Has residential sales engineer in each division who devotes major part of efforts to heat pump promotion. Expect approximately 200 new heat pump installations during 1955.

Company 2. Will coordinate with manufacturers on appointment of new dealer outlets in service area. Support dealers by advertising, staging live exhibits at appropriate public functions and developing prospects. Will continue free engineering service with particular attention to builders and architects. Will aggressively promote commercial and residential installations, and through special arrangements will encourage installations in employees' homes. Sales quotas for 1955 is to exceed 60 installations.

Company 3. Special campaign to encourage employees to install heat pumps in their homes. Estimate sales during 1955 will be approximately 150 units of 3 and 5 hp size.

Company 4. Two men devote full time to heat pump promotion and checking installations. All sales personnel are informed to discuss and make initial quotations on heat pump installations. Several methods used to bring heat pump before public; i.e., newspaper ads, heat pump exhibits at dealers' shows, realtors' shows, and in company and dealer offices. Most publicity gained through talks before builders, realtors, architects, civic clubs and employee groups. Over 25 talks reaching at least 1200 people were given during the first four months of 1955. Quota for 1955 is 150 units. Twenty-one units contracted for to date, with 10 installed. Three housing projects to-

Fig. 1—Companies Reporting Definite Heat Pump Promotional Activities Planned in 1955

* The 1955 EEI Heat Pump Survey was carried out under auspices of Market Research Committee (EEI), Joint AEIC-EEI Heat Pump Committee, and Commercial Electric Space Heating & Air Conditioning Committee (EEI).

taling 90 homes will use heat pumps throughout.

Company 5. Promotion through dealers and manufacturers.

Company 6. Special promotion during March, April, August, September, and October. Sales quota during 1955—50.

Company 7. Promotion by advertising (radio, newspaper and TV), customer contact, employee education, dealer meetings, and talks before civic clubs, trade groups. Will include company installations. Constantly increasing tempo of heat pump and electric heating promotion.

Company 8. Promotion by display of equipment, newspaper advertising, and discussions with architects and builders.

Company 9. Preparing employee booklet on heat pump stressing "positive" approach.

Company 10. Generally encourage prospects to use heat pump; no specific promotions.

Company 11. Heat pump will be recommended where considered best solution to customer's problem. All prospects will be turned over to dealers and no brand names recommended by utility personnel. Sales program for 1955 directed primarily to promotion and sales of heat pump installations. Company will not guarantee performance of any type or make of equipment. If customer cannot secure service from dealer, company will give emergency service or recommend qualified service man. 1955 program includes 3025 tons commercial units and 352 tons residential.

Company 12. Cooperative advertising with distributors.

Company 13. (See No. 11.)

Company 14. Cooperate with dealers in obtaining and evaluating prospects. Sub-metering for operating costs and distributing this information to dealers. Assist dealers in heat loss and heat gain calculations. Use traveling displays. Provide advisory service to dealers on service calls. Check and correct air distribution systems.

Company 15. Sales and engineering training; newspaper advertising; customer wiring subsidy; employee special offer; direct mail promotion; heat pump picture album; heat pump booklet; heat pump homes open to public; special heat pump handout material; sales floor display.

Company 16. (See No. 2.) For overall promotional activities. Sales quota for 1955 is to exceed 36 installations.

Company 17. Exhibit heat pump units at home show. Permanent exhibit of GE and Westinghouse units in company building. Continuous reference to electric space heating on radio, television, and newspaper ads. Group meetings of local contractors, engineers, and builders. Engineering and sales assistance for contractors, dealers, and installers of electric space heating equipment. Space heating brochure available for distribution. Distribute and mail product information and literature.

Company 18. Promotion of commercial installation only, with no set quota for 1955. Residential installations are for research to determine load characteristics. Residential promotion will depend on test results.

TABLE I—GEOGRAPHICAL DISTRIBUTION OF HEAT PUMP INSTALLATIONS AS OF DECEMBER 31, 1954

Based on replies to 1955 EEI Heat Pump Survey.

State	Number of Installations Reported		
	Residential	Commercial	Total
Alabama	82	59	141
Arizona	27	9	36
Arkansas	0	2	2
California	308	104	412
Colorado	1	0	1
Connecticut	0	1	1
Dist. of Columbia	2	3	5
Florida	548	345	893
Georgia	81	34	115
Idaho	12	0	12
Illinois	12	4	16
Indiana	29	15	44
Kansas	9	3	12
Kentucky	6	4	10
Louisiana	65	45	110
Maryland	6	4	10
Michigan	4	3	7
Minnesota	1	0	1
Mississippi	19	22	41
Missouri	17	4	21
New Jersey	16	2	18
New York	3	3	6
North Carolina	15	28	43
Ohio	34	36	70
Oklahoma	5	20	25
Oregon	53	23	76
Pennsylvania	6	28	34
South Carolina	26	54	80
South Dakota	0	1	1
Tennessee	11	10	21
Texas	135	73	208
Utah	4	3	7
Virginia	41	37	78
Washington	20	2	22
West Virginia	8	8	16
Wisconsin	8	2	10
TOTAL	1614	991	2605

NOTE: Includes only installations reported by the 129 companies answering survey.

TABLE II—STATUS OF HEAT PUMP INSTALLATIONS AS OF DECEMBER 31, 1954

Based on installations with reported heat source.

Type of Heat Source	Number of Installations		
	Residential	Commercial	Total
Air	773	479	1252
Ground	68	3	71
Water	463	399	862
TOTAL	1304	881	2185

NOTE: The total number of Residential installations reported by the 129 companies, including those not reported by heat source, is 1614. The total number of Commercial installations reported by the same group, including those not reported by heat source, is 991. The total number of Residential and Commercial installations covered by questionnaires is 2605.

These data indicate that at the present time air heat source type heat pumps are in most use, with those using water not far behind. As most commercial installations consist of multiple units, the total number of heat pump "units" being used for commercial applications is greater than the number of installations shown. The survey was intended to determine how many electric power "customers" are using heat pumps, so the number of installations are of primary interest.

Company 19. Preparation of electric heating manual used for instructional meetings. Sales plan calls for active promotion and development of heat pump business.

Company 20. Training of all sales and supervisory personnel and intend to establish a sales quota. Promotion material being prepared.

Company 21. (See No. 2.) For overall promotional activities. Sales quota for 1955 to exceed 10 installations.

Company 22. (See No. 2.) For overall promotional activities. Sales quota for 1955 to exceed 14 installations.

Company 23. General promotion of heat pump for year-round use during 1955, with no set quota or specific campaign.

Company 24. Sales campaign for period of 12 weeks during year. Several installations being made in company offices, so placed for observation by potential purchasers, and used in promotional demonstrations.

Company 25. 1955 is year of study and personnel training in all types of electric space heating—will have two heat pumps in area by end of year—will promote heat pumps (and resistance heating) starting with one heating and air conditioning specialist in 1955.

Company 26. Promotion limited to estimation of comparative costs for customer and liaison with manufacturers, architects, and builders. Plan to acquaint customers with operational and economical characteristics of heat pumps.

Company 27. (See No. 2.) For overall promotional activities. Sales quota for 1955 to exceed 74 installations.

Company 28. Personal sales contact with individual customers. Demonstrations at fairs, etc.; cooperative advertising. Installations in company buildings; quota—12 units.

Company 29. Product and sales training for key company personnel; sales and descriptive booklet and pamphlet for employees and prospects; newspaper advertising in air conditioning area of territory; employee prospect bonus plan; heat pump displays in company offices.

Company 30. Continue to follow up inquiries, furnish data to interested parties, and promote the advantages of this type of year-round air conditioning.

Company 31. In process of determining 1956 promotional activities.

Company 32. $35 allowance for purchase of "reverse cycle" window units. Promotional "off-peak" "off-season" rate, approximately 1¼¢ per kwhr.

Company 33. Installing units in two small offices. Ten trial installations of 1-ton window units.

Company 34. 1955 air conditioning promotion during May, June, July, and August will place emphasis on heat pump. No sales quota.

Company 35. Model home installation as part of promotion.

Company 36. Newspaper, television, radio, direct mail, and personal contact by company personnel.

Company 37. Concentrated promotional activities during 1955.

Company 38. Promotion through new builder development department. 1955 sales quota of five heat pumps for commercial or residential applications.

Company 39. Will install heat pumps in three company offices during 1955 for use as promotional items.

Company 40. Television, newspaper, and magazine advertising; field tests; direct mailing pieces; installations in new power company buildings; company financing plan for employees; encourage manufacturers to establish dealer outlets in area; promote heat pump to speculative builders and sponsor several all electric homes with heat pumps; heat pump training for sales personnel; heat pump manual containing catalogues, authoritative data, reprints, users lists, and local test data for use by architects and engineers.

Company 41. Coordinated promotion with dealers through advertising and exhibits at home shows, etc. Quota for 1955 is 30 units.

Company 42. Sales and promotion through direct mail and personal contact of customers building new structures. Cooperation with architects, engineers, and builders through group presentation.

Company 43. Continuation of present plan to assist in promoting installations of heat pumps. Displays on subject at shows, fairs, etc. Window displays where feasible.

Company 44. Our promotional efforts have been mainly directed toward the education of electrical dealers and contractors as well as our own sales people.

Company 45. Training of sales personnel. Provide technical services and assistance to customers and dealers. Advertising in company sales publication.

Company 46. (See No. 2.) For overall activities. Sales quota for 1955 is to exceed six installations.

Companies participating in the survey were informed of their individual code numbers in this summary but not the code numbers of other companies.

1956 Coordinated Program Stresses Electrical Gifts

ELECTRICAL gifts for every occasion including for the bride, the graduate and Mother's Day will be promoted in the new 1956 EEI Coordinated Program—headlined, "Be Modern—Give Electrical Gifts"—to be held in May and June.

Promotional kits, samples of which will be mailed January 10, consist of 34 pieces printed in four colors: two double faced wire hangers, two window streamers, two window pieces, two easel counter cards, one easel "Check List" and one window "Check List," and twenty-four 2″ by 2″ stick-ons.

Robert L. Coe, Chairman of the EEI Residential Promotion Committee, said, "The popularity of small appliances is such that any gift giving occasion is more significant when an electric appliance is given. So, when dealers remind the public they are prepared to supply the preferred gift for Mother's Day, for the bride, for the graduate, for anniversaries, for housewarmings, in fact for any event they are taking advantage of a presold market."

H. F. Carr, Chairman of the Small Load Builders Committee, said that the Spring Electric Gifts promotion is expected to be one of the biggest coordinated programs yet. He pointed out that small electric appliances are increasing as gift items and that the EEI gift kit for this last Christmas season had nearly twice as many participants as the previous one—almost 9000 kits used throughout the country.

Reminding retailers of the many benefits they derive from handling portable electric appliances, Mr. Carr cited these reasons: they have good public acceptance; the price is within reach of most pocketbooks and is within the reasonable range for a gift purchase; delivery, installation and service are no problem; their use and purchase is not necessarily seasonal; the possibilities for point-of-sale display are excellent; they are naturals for demonstrations; they carry a better mark-up than the so-called major appliances; and they do not require dealer trade-ins.

Deadline for orders of promotional gift kits will be February 4.

February 1 Deadline for PUAA Better Copy Contest

Plans for the 1956 Better Copy Contest, sponsored annually by the Public Utilities Advertising Association, are under way, with chairmen selected to head up the contest's 22 classifications, according to Contest Chairman Warren W. Widenhofer, Public Relations Director, Indiana & Michigan Electric Co.

The 1956 contest will judge advertising produced in 1955. Entries will be submitted during January, with the deadline for entries set as February 1 with the exception of annual reports, which must be submitted for judging by April 2. Winners will be awarded certificates during PUAA's annual convention slated for Philadelphia, Pa., May 10-11.

The PUAA-sponsored contest has achieved the distinction of being the oldest national advertising contest. It has been conducted for 33 consecutive years. The contest is open to PUAA's nearly 450 members as well as gas, electric, and transportation utilities throughout the United States, Canada, and Hawaii who are not members.

The Electric Utilities—Opportunity and Challenge

(*Continued from page* 390)

There is also a growing realization at the grass-roots level that the electric industry belongs not to a few monied interests, but to millions of Americans from every walk of life. A few weeks ago, when it was announced that the common stock of the Ford Motor Co. would be sold to investors, this step was universally applauded as a change from private to public ownership. On this basis, our industry is the most public of all business enterprises. The public utility industry has about 3½ million direct stockholders. Sixty per cent of the industry's debt securities are owned indirectly by life insurance policyholders numbering another 90 million people. These same policyholders, through their life insurance investments, have provided not less than 25 per cent of the industry's total capital funds. Pension funds, investment trusts, educational foundations, and the like have further increased the public ownership of our industry.

Joint Publicity Effort

In closing, I would like to ask that you, who are so closely associated with us, join now in our efforts to give these basic facts the widest possible publicity. I am sure you feel a responsibility toward the investors, both individual and institutional, who own nearly $27 billion of our industry's outstanding securities. Many of them are your clients and have purchased this industry's securities as a result of your efforts. In joining with us to fight socialized power, you not only will help to preserve an industry you have helped to create, but you will be safeguarding all American industry from the blight of socialization. We welcome your aid!

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Financing Utility Capital Requirements, 1949	1.00	1.00
"Elgas Co.—Simulated Federal Income Tax Return," 1947	1.00	1.00
Accounting Development Service—Series of periodic bulletins issued about every 3 months—describing new methods, procedures, machines, equipment, etc., of interest to electric and gas accountants; selected by specially appointed Committee.	$2.50 yearly	
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54-2—Electric Light and Power Industry, 1953 (1954)	1.00	1.00
53-2—Electric Light and Power Industry, 1952 (1953)	1.00	1.00
52-2—Electric Light and Power Industry, 1951 (1952)	1.00	1.00
51-2—Electric Light and Power Industry, 1950 (1951)	.75	.75
50-2—Electric Light and Power Industry, 1949 (1950)	.75	.75
(Statistical Bulletins also available for years 1932 to 1949 (inclusive) each	.75	.75
Weekly, Monthly and Annual Statistics (Includes Annual Statistical Bulletin; Weekly Electrical Power Output; Monthly Electrical Research Statistics)	2.00	2.00

Engineering Committees

ACCIDENT PREVENTION—RESUSCITATION

*100-499 copies 15% discount, 500 or more copies 25% discount.

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54-4—Place of Safety in Selection and Training of Employees	.25	.65
51-8—"By the Grace of God," 1951	.25	.25*
P-9—Application and Care of Rubber Protective Equipment, 1948	.25	.25*
O-15—Use and Care of Pole Climbing Equipment, 1946	.25	.25
M-10—Fifteen Messages on Accident Prevention in Electric Utilities	.10	.10
L-4—Linemen Cutouts (2/45)	.10	
K-8—Pole Top Resuscitation (9/43) (Quantity Prices on Application)	.10	

ELECTRICAL EQUIPMENT COMMITTEE

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M-15—Recommended Safety Practices for Electrical Metermen—Single copies		.25
10 to 49 copies		.20
50 to 99 copies		.18
100 or more copies		.15
M-3—Principles of System Relaying (1945)	.60	1.50
F-13—Reconditioning Flood Damaged Electrical Equipment (12/38)	.30	.75

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55-9—Hydraulic Turbine and Draft Tube Settings	.40	1.00
52-14—Pitting Experiences of Hydraulic Turbines	.60	1.50

JOINT REPORTS

55-8—Polyphase Motor Starting Current Rules, AEIC, EEI, NEMA, 1955	.25	.25
53-1—Standards for Distribution Transformers, Overhead Type—5th Report, EEI-NEMA, 1953	1.00	1.00
51-19—Joint Use of Poles in Rural Areas, EEI-Bell Systems, 1951	No charge	
51-16—Inductive Coordination Aspects of Power Factor Correction Capacitor Installations — Engineering Report No. 50 — Joint Subcommittee on Development & Research — EEI and Bell Telephone System—1951	.80	2.00
51-3—Recommended Standards for Distribution Transformers, Conventional Subway Type—1st Report, EEI-NEMA, 1951	.60	.60
R-9—Branch Circuit Overcurrent Protection for Low-Voltage Circuits of 30 Amperes or Less Used for Interior Wiring—Report of Joint Committee on Branch Circuit Protection of AEIC & EEI, 1949	1.00	1.00
R-6—Preferred Voltage Ratings for A-C Systems & Equipment, EEI-NEMA (1949). Send orders to American Standards Association	.70	.90
Q-8—Single - Phase Motor Starting Current Rules, EEI-NEMA-AEIC, 1948	.25	.25
Q-4—Guide for Specification on Indoor Metalclad Switchgear, AEIC-EEI-NEMA, 1948	.25	.25
P-1—Mutual Assistance in General Emergency Situations Affecting both Power & Telephone Service — Report of Joint Subcommittee on Cooperation in Emergencies, EEI and Bell Telephone System	No charge	
O-12—Report of Joint Engineering Committee of Association of American Railroads & EEI on Crossings of Electrical Supply Lines and Facilities of Steam and Electrified Railroads (8/46)	.50	
Quantities of 25 or more	.40	
O-11—Mutual Practices Applying to Installation and Maintenance of Equipment Used in Providing Telephone Service by Power Line Carrier in Rural Areas (For Field Trial)—Report of Joint Committee on Plant Coordination of EEI and Bell Telephone System	No charge	
M-12—Joint Pole Practices for Supply and Communication Circuits—EEI-Bell Telephone (1945)	.50	1.25
M-9 — New Developments in Office Machines — Joint AGA-EEI Customer Accounting Committee Report	.50	.50
M-5—Principles and Practices for Inductive Coordination, Allocation of Costs and Joint Use of Poles—EEI-Bell Telephone (1945)	No charge	
L-5—Interim Report of The American Research Committee on Grounding (1/44)	.10	
K-1—Volume 5 of Engineering Reports Nos. 39 to 49 of Joint Subcommittee on Development and Research (1/43)	5.00	10.00
J-6—Wave Shape of Multi-Phase Rectifiers—Engr. Report No. 49—Joint Subcommittee on Development and Research (8/42)	.50	1.25
J-4—Low Frequency Shielding in Telephone Cables—Engineering Report No. 48—Joint Subcommittee on Development and Research (5/42)	.80	2.00
J-1—Positive Disconnection of Distribution Circuits During Faults to Ground—Engineering Report No. 47—Joint Subcommittee on Development and Research (4/42)	.60	1.50
I-8—Susceptiveness of Subscriber Station Sets—Engineering Report No. 46—Joint Subcommittee on Development and Research (12/41)	.60	1.50
I-7—Frequency Weighting for Message Circuit Noise — Engineering Report No. 45—Joint Subcommittee on Development and Research (12/41)	.20	.50
H-12—Neutralizing Transformers — Engineering Report No. 44—Joint Subcommittee on Development and Research (7/41)	.30	.75
H-10—Effects of Bonding Exchange Aerial Telephone Cable Shields to Multi-Grounded Power Neutrals — Engineering Report No. 43—Joint Subcommittee on Development and Research (6/41)	.30	.75
H-8—Standard Basic Impulse Installation Levels — AIEE-EEI-NEMA (1/41)	.05	.05
H-3—Inductive Coordination Aspects of Peterson Coil Grounding—Engr. Report No. 42—Joint Subcommittee on Development and Research (12/40)	.25	.65

PRIME MOVERS COMMITTEE

	Members	Non-Members
55-21—Instruments and Controls Practices for Recent Single Boiler Turbine Reheat Installations	.80	2.00
54-17—Blowing Out Main Turbine Steam Lines before Initial Operation, 1954	.40	1.00
54-15 Turbine Operating and Outage Data Report, 1953 (1954)	.40	1.00
54-6—Turbine Operating and Outage Data Report, 1952 (1954)	.40	1.00
53-10—Turbine Operating and Outage Data for 1951, 1953	.40	1.00
52-13—Metallurgy and Piping Report, 1952	.80	2.00
52-5—Turbines, Condensers and Auxiliaries, Feed-water Heaters, Evaporators, and Deaerators, 1950 (1952)	1.40	3.50
51-9—Power Station Chemistry, 1951	.50	1.25
51-5—Turbines, Condensers & Auxiliaries, Feedwater Heaters, Evaporators & Deaerators, 1949 (1951)	1.20	3.00
51-1—Gas Turbines, 1951	.20	.50
50-13—Deposits on Gas Side of Steam Generating Units, 1951	.30	.75
50-10—Metallurgy and Piping Report, 1950	.90	2.25
50-1—Turbine & Condensers and Associated Equipment, 1948 (1950)	1.00	2.50
R-13—Turbine and Boiler Overhaul Practice (1949)	.50	1.25
R-8—Boiler Auxiliaries, 1948	.30	.75
R-7—Metallurgy and Piping, 1948	.60	1.50
R-3—Turbines, Condensers & Auxiliaries, Feedwater Heaters & Evaporators, 1946-47 (1949)	1.40	3.50
R-1—Boilers & Combustion, 1948 (1949)	1.00	2.50
P-10—Boiler Auxiliaries, 1946-1947	.70	1.75
P-8—Turbines, Condensers, and Their Auxiliaries, 1945-1946	1.00	2.50
P-4—Metallurgy and Piping, 1947 (9/47)	.60	1.50
O-13—Boilers and Combustion, 1946	1.00	2.50
M-6—Boiler Auxiliaries, 1944-45	.70	1.75

TRANSMISSION AND DISTRIBUTION COMMITTEE

55-10—Cable Operation, 1953 (1955)	.70	1.75
54-8—Cable Operation, 1952 (1954)	.70	1.75
54-5—A-C Network Operations, 1950-52	.75	1.90
53-16—Cable Operation Report, 1951	.70	1.75
52-10—Cable Operation Report, 1950 (1952)	.70	1.75
52-6—Cable Operation Report, 1949 (1952)	.70	1.75
51-10—Cable Operation Report, 1948 (1951)	.70	1.75
51-6—A-C Network Operations, 1947-1949 (1951)	.65	1.65
50-3—Cable Operation, 1947 (1950)	.75	1.75
Q-12—A-C Network Operations, 1944-1946 (1949)	.60	1.50
O-10—Cable Operation Report, 1946	.75	1.75
Q-1—Cable Operation Report, 1945	.75	1.75
K-10—Line Clearing Manual, 1944—1-9 copies		35c.

SUGGESTIONS FOR SPECIFICATIONS

10 to 49 copies, 25% discount
50 or more copies, 50% discount

AP-1—Specifications for Electrical Workers Insulating Safety Headgear, 1954	.25	.25
MS-1—Suggestions for Specifications for Standard Dial Constants for Alternating Current Watthour Meters (8/40)	.10	.10
MSJ-3—Standards for Metering Current Transformers for Primary Circuits, AEIC-EEI-NEMA, 1951	.10	.10
MSJ-4—Standards for Indicating Demand Registers, AEIC-EEI-NEMA, 1952	.50	.50
MS-5—Specifications for Indicating Thermal Watt Demand Meters, 1946	.10	.10
MS-6—Specifications for Marking and Arrangement of Terminals for Phase-Shifting Devices Used in Metering, 1946	.10	.10
MSJ-7—Standards for Watthour Meter Sockets, AEIC-EEI-NEMA, 1950	1.25	1.25
MSJ-8—Standards for Test Blocks and Cabinets for Installation of Self-Contained "A" Base Watthour, Meters, AEIC-EEI-NEMA, 1951	.50	.50
MS-9—Specifications for Test Switches for Transformer Rated Meters, 1954	.25	.25
TD-1—Specifications for Steel Bolts and Nuts, 1949	.10	.10
TD-2—Specifications for Strand Eye Anchor Rods 1942	.10	.10
TD-3—Specifications for Lag Screws, 1950	.10	.10

	Members	Non-Members
TD-4—Suggestions for Specifications for Eye Bolts	.10	.10
TD-5—Specifications for Eyenuts and Eyelets, 1955	.15	.15
TD-6—Suggestions for Specifications for Steel Crossarm Braces 1940	.10	.10
TD-7—Specifications for Spool Type Secondary Racks 1948	.10	.10
TD-8—Suggestions for Specifications for Straight Tinned Copper Connectors 1940	.10	.10
TD-9—Specifications for Single Tube Seamless Copper Splicing Sleeves 1942	.10	.10
TD-10—Specifications for Rolled Steel Washers, 1953	.10	.10
TD-11—Specifications for Guy Hooks and Guy Strain Plates, 1951	.10	.10
TD-12—Specifications for Pole Guards, 1946	.10	.10
TD-13—Specifications for Guy Thimbles, 1950	.10	.10
TD-14—Specifications for Moulding Staples, 1954	.15	.15
TD-15—Specifications for Pole and Lower Steps, 1946	.10	.10
TD-16—Line Hardware Materials Inspection Procedure, 1950	.10	.10
TD-17—Specifications for Bolt Type Steel Insulator Pins with One Inch Diameter Lead Threads, 1947	.10	.10
TDJ-19—Standard Mounting Bracket for Distribution Cutouts and Distribution Lightning Arresters, 1949	.10	.10
TD-21—Specifications for Steel Clevises for Guy Strain Insulators, 1952	.10	.10
TD-22—Specifications for Pole Top Pins, 1951	10.	.10
TD-23—Specifications for Guy Clamps, 1951	.10	.10
TD-51—Specifications for Low and Medium Voltage Pin Type Lime-Glass Insulators 1942	.25	.25
TDJ-52—Standards for Wet-Process Porcelain Insulators — Suspension Type, EEI-NEMA, 1952	.25	.25
TDJ-53—Standards for Wet-Process Porcelain Insulators — Spool Type, EEI-NEMA, 1952	.25	.25
TDJ-54—Standards for Wet-Process Porcelain Insulators — Strain Type, EEI-NEMA, 1952	.25	.25
TDJ-55—Standards for Wet-Process Porcelain Insulators—Low-and-Medium Voltage Pin Type, EEI-NEMA, 1952	.25	.25
TDJ-56—Standards for Wet-Process Porcelain Insulators — High-Voltage Pin Type, EEI-NEMA, 1952	.25	.25
TDJ-57—Standards for Wet-Process Porcelain Insulators—High-Voltage Line-Post Type, EEI-NEMA, 1952	.25	.25
TD-71—Suggestions for Specifications for Insulator and Pin Threads and Gauges, 1937	.10	.10
TD-72—Tentative Specifications for Line Connectors and Splices 1949	.10	.10
TD-90—Specifications for Douglas Fir Crossarm Treated or Untreated, 1949	.10	.10
TD-91—Specifications for Dense Southern Pine Crossarms, Preservative Treated, 1950	.10	.10
TD-100—Specifications for Full-Length Non-Pressure Preservative Treatments of Poles (Hot and Cold Submersion Processes), 1952	.25	.25
TDJ-110—Standards for Distribution Fuse Links, EEI-NEMA, 1951	.15	.15
TDJ-131 — Standards for Filament Lamps Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-132—Standards for Photometric Tests for Luminaries Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-133—Standards for Voltage Classification of Luminaires Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-134 — Standards for Pendant Luminaire Mounting Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-135—Standards for Street Lighting Poles Used in Street and Highway Lighting, EEI-NEMA, 1953	.30	.30
TDJ-136—Standards for Series Sockets and Series-Sockets Receptacles Used in Street and Highway Lighting, EEI-NEMA, 1951	.10	.10
TDJ-139—Standards for Materials, Finishes and Performance Tests for Equipment, EEI-NEMA, 1953	.20	.20
TDJ-140—Standards for Metal Head and Reflector Interchangeability, EEI-NEMA, 1953	.10	.10
TDJ-142—Standards for Open Reflector Mountings Used in Street and Highway Lighting, 1953	.20	.20

Commercial Division Reports and Manuals

*Quantity Prices Upon Request

Agriculture	Members	Non-Members
Farm Electrification Lesson Plans for Vocational Agriculture Teachers, 1955	.50	.50
55-3—Your Stake in Better Land Use	.25	.25
53-19—Electrical Projects for Youths	1.50	2.50
53-18—Ideas for Farm Display, 1953	1.00	2.50
53-15—What Electric Companies Are Doing in Farm Betterment Programs, 1953	1.00	1.00
53-14—Practical Farm Wiring Demonstrations, 1953 ....1 to 49 copies	.50*	
Farm Lighting Slide Kit—20 black & white, 2 x 2 slides and script...single kit	$5.00*	
Farm Electrification Speakers' Slide Kit on Electrical Safety and Maintenance on the Farm—57 Kodachrome slides and speakers' scrips—single kits	12.00*	
51-11—Farm Electrification Research, 1951	1.00	1.00
50-8—Farm Electrical Equipment Handbook, 1950. Single copy 2.25 postpaid.*		
Farm Electrification Manual—Includes 18 Sections	6.75	11.00*
Prices of individual sections upon request.		
General		
55-6—Current Status of Commercial Heat Pump Promotion by Electric Utilities	.25	.50
53-5—Study to Determine the Load and Revenue Potential of Apparel Stores, 1953	.50	.50
52-11—Application of Electrical Equipment in Commercial Establishments, Revised Edition, 1955	1.00	2.50*
51-15—Study to Determine Load and Revenue Potential of American Food Markets, 1951	.25	.25
51-12—Study to Determine Load and Revenue of Water Heater Market, 1951	.25	.25
P-6—The Heat Pump (7/47)	.25	.25
Lighting		
55-11—Residential Lighting Promotion, 1955	.25	.25
55-4—Summary of Preliminary Questionnaire on Mercury Fluorescent Lamps Used for Street and Highway Lighting	.50	.50
54-14—Suggestions for Developing Effective Commercial Lighting Field Organization, 1954	1.00	1.00
54-9—Bonus Bulb Promotion, 1954	.25	.25
Power		
I-1—Power Sales Manual—Volumes I and II, includes two binders and tabs. Prices available upon request.		

NATIONAL PROGRAMS

Better Light Better Sight Bureau

"Teaching About Light and Sight"—Classroom program for teaching about light and sight in 5th and 6th grades. Price list on request.

"Living With Light" — Classroom program for teaching about light and sight in Junior High School Science classes. Price list on request.

"Lighting for Better Living"—Program for teaching about light and sight in Home Economics classes, 4-H Clubs and Extension Groups. Price list on request.

"Working with Light"—program of supplementary study materials for use in Industrial Arts and Vocational Education classes, adult education and 4-H groups. Price list upon request.

"Light Is What You Make It"—A sound movie in Technicolor produced by Walt Disney Productions, 16 mm, 10 min. Price schedule on request.

Planned Lighting Program

Series of mailers and booklets promoting planned lighting for stores, schools, offices, industries and homes. Price list upon request.

Sales Training Program

Three Courses Available—Residential, Commercial and Rural Prices upon request.

Appliance Sales Training Course—6 Films and Records	250.00
Set of 6 Salesmen's Manuals for above course	4.50
Industrial Sales Training Handbook	18.50
Residential Lighting Film & Record	30.00
Residential Lighting Salesmen's Manual	.75

OTHER PROMOTIONAL MATERIALS

A detailed price list covering the following is available upon request to the EEI Commercial Department. This price list also contains information on other available Commercial Materials.

Commercial Cooking, Water Heating and Lighting Materials.

Farm Electrification Materials.

Industrial and Residential Promotional Materials.

Sales Personnel and Training Materials.

Miscellaneous Publications

*Quantity prices upon request.

	Members	Non-Members
55-20—18th Electric Power Survey Report, 1955	.75	.75
55-18—I Want to Know About the Electric Industry, 1955-56...Single copies	.25	.25
55-15—Pocketbook of Electric Industry Statistics, 1955 .....Single copies	.35	.35*
55-17—Effect of An Atomic Blast on Electric Power Facilities 1 to 10 copies	.75	.75*
54-3—Protection of Industrial Land, Method and Results, Report of Ind. Development Subcommittee, Area Development Committee, 1954	.40	1.00
54-1—Ohio Conservancy Law and Ohio Conservancy Districts, Report Natural Resources and Agricultural Development Subcommittee Area Development Committee, 1954	.40	1.00
53-6—Area Development Suggestions, #3, 1953	.30	.75
53-4—Bibliography of Heat Pump, Through 1951	1.00	1.00
52-17—Area Development Suggestions, Number 2	.25	.40
52-12—Area Development Suggestions #1, 1952	.40	1.00
52-3—Report of the Industrial Development Subcommittee of EEI Rural & Urban Development Committee, 1952	.50	1.25
52-A—Report of Recreation & Travel Development Subcommittee of EEI Rural & Urban Development Committee, 1952	.25	.65
52-B—Report of Civic Development Subcommittee of EEI Rural & Urban Development Committee, 1952	.25	.65
51-18—Specifications for Impregnated Paper Insulated Cable, High Pressure Pipe Type—1st Edition, AEIC, 1951 ....Single Copy	1.00*	
51-4—Specifications for Impregnated Paper Insulated Lead-Covered Cable Oil-Filled Type, AEIC, 1951...Single Copy	1.00*	
50-7—Specifications for Alternating-Current Power Circuit Breakers (2nd Edition), AEIC, 1950	.60	.60
50-6—Principles for Sound Water Resources Development, 1950	21.00 per thousand 3.00 per hundred	
R-17—Specifications for Impregnated Paper-Insulated, Lead-Covered Cable, "Solid" Type (8th Edition) AEIC, 1949	1.00	1.00
R-12—Electrical Meterman's Handbook —6th Edition—1950....Single copy	3.30	4.90*
Q-11—Suggested Field Test Procedure for Determination of Coefficient of Performance Factor of an Electric Heat Pump While Operating on Heating Cycle, 1948	.25	.25
Q-5—Specifications for Impregnated Paper-Insulated, Lead-Covered Cable, "Low Pressure, Gas-Filled" Type—AEIC, 1948 ....Single copies 10 or more copies	1.00 .85	
Rate Book for 1955	20.00	30.00
Weekly, Monthly and Annual Statistics (Includes Annual Statistical Bulletin; Weekly Electric Power Output; Monthly Electrical Research Statistics)	2.00	2.00

Periodicals

Better Light Better Sight News (6 issues yearly)	1.00	1.00
Edison Electric Institute Bulletin (Monthly)	2.00	2.00
Farm Electrification (a bi-monthly publication) Up to 10 copies	Free	
Over 10 copies	.75	1.00
Quantity prices upon request.		
Home Service Exchange Yearly subscription	1.00	1.50
One free copy to members upon request.		

The Credit Picture

(*Continued from page* 406)

charge off to uncollectible is still out of line in relation to the growth in sales and customers.

Favorable Indications

There are some favorable indications, particularly in the down-turn of the number of discontinued notices, the number of customers disconnected for non-payment, and the number of accounts charged off to uncollectibles, that we may be in an area of transition to better collection results, although it would be too early to make such a prediction in view of the rather sharp variations which have occurred in the past between the six-month periods. It is encouraging, however, that the increases percentage-wise in the number of disconnections for non-payment and the number of accounts charged off to uncollectibles are both lower for the current period than in three of the five previous semi-annual periods.

Greater Deposit Coverage

There is a continuing trend for greater deposit coverage to partially off-set increased losses. The 8.6 per cent rise shown for the period ending June 1955 is the highest such six month increase on record, and it is further supported by the fact that nearly 85 per cent of the companies reported greater deposit coverage this year than last.

Losses from industrial accounts apparently have not materially changed since last year. The 18 companies reporting such losses show approximately $35,000 for both six-month periods.

Seasonal Influences

Details regarding losses for separate gas and electric operations will not be given in this mid-year report because of seasonal influences in the gas industry, but on a comparable basis with last year the results reported indicate that changes in dollar losses and the ratio of losses to sales show greater increases for the gas companies than for electric. The ratio of gas losses to sales was about 30 per cent higher than for comparable electric losses.

Individual companies are reporting that their current collection position with respect to number and amount of delinquencies and field collections are showing improving trends and this, coupled with the fact that the major indices are rising including the Federal Reserve Board Index of Industrial Production which for several months has been higher than last year, could indicate that these factors forecast a better showing in the statistics which will be reported for the six-month period ending December, 1955.

It is expected that the Credit Picture Committee will continue its efforts to study the presentation of factual data so as to improve such presentation for broader use by the industry. In this connection, the committee will meet during the year to discuss plans to this end and all companies are invited to submit suggestions as to how data might be presented. Comments may be forwarded to the American Gas Association or Edison Electric Institute headquarters offices.

Last Call for Entries—

Deadlines Draw Near on EEI Awards Contests

1955 has been a top year in sales achievements. So, if your company has had exceptional results in any of the following promotions, don't lose any time in compiling entries in the appropriate contests.

February 1, 1956

George A. Hughes Awards
(Electric ranges and water heaters; commercial electric cooking)

Laura McCall Awards
(Home Service)

George Westinghouse Awards
(Electric Laundry Equipment)

General Electric Company
(More Power to America)

February 15, 1956

T. W. Martin Award
(Rural Electrification)

Better Light Better Sight Bureau
(Lighting Education)

Lighting Promotion Awards
(Lighting Promotion)

Frank Watts Awards
(Rural Electrification)

Because of the greatly simplified entry rules this year several entries can be compiled at less expenditure of time and labor than was formerly spent on one entry. Small and medium size companies especially will find it much easier to enter one or more of the contests because of the simplified rules.

Don't miss out on the opportunities offered by these Awards Contests to win national recognition as well as awards for your most successful promotions.

Chief Executives . . .

Please Note

This is a reminder that the deadline for an entry in the Claude L. Matthews Award for Valor contest is February 1, 1956.

The recommendation covering an act or acts of extraordinary courage in your company during 1955 must be made by the Chief Executive (or acting representative).

Because the February 1, 1956, deadline is drawing near, it is suggested that your recommendation be made without delay so that a deserving act of valor can receive the national recognition it merits.

Send your recommendation to Secretary, Awards Committee, Edison Electric Institute, 420 Lexington Avenue, New York 17, New York.

Personals

Hudson R. Searing, President of Consolidated Edison Co. of New York, Inc., has been elected Chairman of the Board and chief executive officer of his company, following Board action which re-established the office of chairman of the board and discontinued the office of executive vice president.

Harland C. Forbes, who had been Executive Vice President, has been elected President of his company.

Mr. Searing served as Con Edison's president for nearly seven years and has been chief executive officer of the company since 1953. A World War I veteran and an electrical engineering graduate of The Cooper Union, he has been with the Con Edison system for 46 years. He was first employed as a telephone operator by a Con Edison predecessor, New York Edison Co., and, after graduation from Cooper Union, worked with United Electric Light and Power Co., another Con Edison predecessor. At United Electric he was one of the team that developed the low-tension a-c network. In 1932 he became general superintendent of distribution for both New York Edison and United Electric. He was elected vice president in 1940 and executive vice president in 1944, in which positions he played a part in integrating the operating facilities and personnel of the the electric, gas and steam utilities which were successively merged to create the present Con Edison system.

Mr. Forbes joined New York Edison in 1924 as assistant to the chief electrical engineer. Prior to that he had acquired a bachelor of science degree at the University of New Hampshire and a master of science degree at Massachusetts Institute of Technology and had worked for a year with Western Electric Co. In 1928 he became research engineer and was appointed system engineer in 1932. He was elected a vice president in 1945 and executive vice president in 1949.

Turner White, Jr., has been elected President of Electric Energy, Inc., in a move in which all principal officers of the five electric companies which own the firm resigned. They have been replaced by operating executives of the company.

Other new officers are **John G. Koopman,** Vice President in Charge of Operations; **E. E. Smith,** Secretary and Treasurer; and **H. F. Sanders,** Assistant Secretary and Assistant Treasurer.

Mr. White has been vice president of Electric Energy, Inc., since the company's organization in 1950. A graduate of the University of Southern California School of Engineering, he previously served as superintendent of construction for Union Electric Co. of Missouri.

Mr. Koopman, joined the company in 1952 as general plant superintendent at the Joppa Station. He previously was associated with Central Illinois Public Service Co., where he held various positions, including plant superintendent of the Hutsonville and Meredosia Generating Station.

Mr. Smith, joined the company as assistant treasurer in 1951 and later assumed the position of assistant secretary.

All officers who resigned will continue as directors of Electric Energy, Inc.

Philip Sporn, President of American Gas & Electric Co., has been named winner of the John Fritz Medal for 1955 by American Society of Mechanical Engineers. Mr. Sporn received the medal and honorary membership in ASME at the society's diamond jubilee celebration in Chicago, Ill., on Nov. 17, 1955.

Lansing T. Smith, Vice President and General Manager of Gulf Power Co., has been elected President and General Manager of his company, succeeding **James F. Crist,** President since 1948, who will continue as a Director and Vice President.

Mr. Smith joined Gulf Power in 1926 as executive assistant and became new business manager in 1933. He became sales promotion manager in 1942 and was appointed assistant to the general manager in 1949, a position he held until being made vice president in 1951. He became vice president and general manager in 1953. Before joining Gulf Power he was superintendent of the Northern Division of Alabama Power Co. He is an electrical engineering graduate of Alabama Polytechnic Institute and is a director of both the Southeastern Electric Exchange and Southern Services, Inc.

John W. Lapham, the dean of the regional public utility association managers in the United States, has retired as Secretary-Manager of the North Central Electric Association after 30 years of service in the electric utility field. **Lloyd F. Wilkes,** former Executive Secretary of the Minnesota Highway Study Commission and, since April, Assistant Secretary-Manager of NCEA, has been named to succeed Mr. Lapham.

A graduate of the University of Michigan Law School, Mr. Lapham served as city attorney, postmaster, and mayor of Chanute, Kansas, and was manager of an oil and gas production company prior to accepting the position of secretary-manager of NCEA on April 1, 1925.

Mr. Lapham developed the idea of a "Central Station Conference" which now brings representatives of all electric suppliers together annually to discuss generation, distribution, and consumer service. He organized the first "South Dakota Electrical Conclave" and played an active role in all electrical industry programs developing new markets for electrical applications and an optimum service to the customer.

He was instrumental in promoting the idea of an Electrical Trade Development Committee and presided at the meeting when the North Central Electrical Associated Industries (now known as the North Central Electrical League) was organized.

Mr. Wilkes, who is a graduate of the University of Minnesota, served during World War II with the Office of Naval Intelligence in England, Italy, Egypt, Iran, Iraq, Arabia, Palestine, and Algeria. During the past nine years, he has served as executive secretary of the Minneapolis Chapter of the American Institute of Banking, Tax Research Council for the Minnesota Taxpayers

Association, member of the "Little Hoover" Citizens Committee, and executive secretary of the Minnesota Highway Study Commission.

H. Hugh Lenhart, Vice President and General Manager of Cheyenne Light, Fuel & Power Co., a subsidiary of Public Service Co. of Colorado, has been elected Chairman of the Board of the Cheyenne Company. He has been succeeded as Vice President and General Manager by **Oliver P. Reed,** Operating Superintendent of the company.

Mr. Lenhart held various executive positions with the parent company before joining Cheyenne Light in 1940 as vice president and general manager. He is a former president of the Rocky Mountain Electrical League.

An electrical engineering graduate, Mr. Reed has served the Cheyenne company since 1931 as district superintendent and operating superintendent.

L. J. Weber, of the Electric Distribution Department of Public Service Co. of Colorado, has succeeded Mr. Reed as operating superintendent at Cheyenne.

At Public Service Electric and Gas Co., **Herbert E. Cliff,** General Commercial Manager, has been elected Vice President in Charge of Commercial Operations to succeed **Henry P. J. Steinmetz,** who is retiring.

A graduate of Swarthmore College, Mr. Cliff joined the company in 1924 as a commercial cadet and, after various staff assignments, was made assistant general commercial manager in 1940. He assumed his previous position in 1949. He is a former president of the New Jersey Public Utilities Association and of the New Jersey Gas Association.

Mr. Steinmetz, who retires after 48 years of service with Public Service, was vice president in charge of sales since 1937.

Harold D. Beebe has been elected a Vice President of Stone & Webster Service Corp. He joined the company in 1950 and became head of its Electric Department in 1954.

An engineering graduate of Yale University, Mr. Beebe previously served as assistant to a vice president and later as general superintendent of Tampa Electric Co. prior to joining Stone & Webster. He had worked in most of Tampa Electric's production and distribution departments.

Robert A. Olson, Secretary-Treasurer of Kansas City Power & Light Co., has been named Vice President and Treasurer and has been elected a director to fill the vacancy on the board resulting from the recent death of **Ernest L. Godshalk.** In his new capacity, Mr. Olson will exercise general supervision over all financial and accounting activities of the company.

Two other executive personnel changes announced at the same time were the appointments of **Robert H. Busler,** Assistant Secretary, as Secretary, and **Kenneth G. Hovland,** Assistant Controller, as Assistant Treasurer.

Mr. Olson joined the company in 1947 as secretary-treasurer. Prior to that he had been employed in the Legal and Financial Departments of The United Light and Power Co. and The United Light and Railways Co., which he joined in 1935. He is a lawyer and was graduated from the University of Iowa.

Mr. Busler joined the company in 1949 as assistant secretary. He is a 1939 graduate of the University of Kansas and received a law degree in 1947 from the University of Michigan. He served in the Army during World War II and held the rank of captain when discharged in 1946.

Mr. Hovland was employed as assistant controller in 1947. A native of Durand, Wis., he was graduated from the University of Wisconsin in 1938. He served as a captain in the Army during World War II.

James F. Fairman, Vice President of Consolidated Edison Co. of New York, Inc., and **K. M. Irwin,** Vice President of Philadelphia Electric Co., have been elected Vice Presidents of Atomic Power Development Associates and **Walker L. Cisler,** President of The Detroit Edison Co., has been re-elected as APDA President.

In other appointments, **John R. Coffin,** of the engineering firm of Jackson & Moreland, has been named a Vice President, and **Andrew A. Kucher,** Director of Ford Motor Co.'s Scientific Research Laboratory, has been elected an APDA Director.

Mr. Fairman, Vice President of Con Edison since 1946, served as head of Defense Electric Power Administration for 17 months in 1951-52. He is a past president of AIEE.

Mr. Irwin was executive director of the London staff, Public Utility Committee, Combined Production & Resources Board in World War II. Associated with Philadelphia Electric since 1931, he has been a vice president since 1948.

At Southern California Edison Co., **George N. Hawley,** Vice President in Charge of Commercial Operations, has been named to the post of Vice President and Assistant to the President; **John H. Mead,** Vice President, will take over direction of the company's Commercial Department; and **Joseph R. Brookshire,** Assistant to the President, has been named Assistant Vice President and is to be in charge of public and community relations.

Mr. Hawley, after attending the California Institute of Technology, became associated with the Southern California Edison as an industrial heating specialist in 1928. He was named assistant new business manager in 1935 and was made manager of industrial sales three years later. In 1949 Mr. Hawley was appointed sales manager for the company and in 1950 was made assistant to the president. In 1952 he was elected to his previous position.

Mr. Mead joined the company in 1922 as a supervisor in the joint pole department. He became a special agent in the commercial department in 1927 and in 1929 was appointed manager of the company's Pomona District. Mr. Mead was transferred to Long Beach as district manager in 1936. In 1950 he was appointed an assistant vice president and in 1953 was elected a vice president.

Mr. Brookshire is a graduate of the University of Michigan and the University of Michigan Law School and has been associated with Southern California Edison since 1949. He served as public relations assistant until 1951, when he was named ad-

ministrative assistant and in 1952 was elected assistant to the president.

At General Public Utilities Corp. and two of its subsidiaries, the following personnel changes have been announced.

William G. Kuhns has been elected Secretary of GPU, succeeding **Alfred Healey,** who has resigned to accept the post of Secretary and Assistant Treasurer of New Jersey Power & Light Co., a GPU subsidiary.

Prior to joining GPU in July, 1955, Mr. Kuhns was associated with Wisconsin Electric Power Co. as supervisor of the Tax Division. He is a 1946 graduate of the University of Wisconsin's School of Commerce, where he majored in public utilities, and in 1949 received a law degree from the University of Wisconsin.

J. R. Ketchel, General Superintendent of electric production at Jersey Central Power & Light Co. has assumed the added duties of supervision of electric production at New Jersey Power & Light Co. Both companies are GPU subsidiaries.

Mr. Ketchel has succeeded Chief Engineer **J. P. Mailler,** who has retired after 35 years with New Jersey Power & Light and other affiliates of GPU and predecessors. Mr. Ketchel's appointment was one of the steps in coordinating and integrating operations of the two New Jersey companies. In retirement, Mr. Mailler will continue as consulting engineer during construction of New Jersey Power & Light's office and service building at Denville, N. J.

Thomas C. Woodside, General Auditor, Utah Power & Light Co., has been elected Treasurer of the company, succeeding the late **Richard H. Jones,** and **George W. Fowler** and **Fred L. Mickelsen** both have been named Assistant Treasurers.

Mr. Woodside joined Utah Power & Light in 1924 and held the positions of clerk, chief clerk, and assistant general auditor prior to being appointed to his previous post in 1946. He was educated at the New Jersey Academy and the Utah State Agricultural College.

Mr. Fowler, who has been Assistant General Auditor since 1952, succeeds the late **V. L. Halliday** as Assistant Treasurer. He has been associated with UP&L since 1927 and worked as bookkeeper and clerk, senior accountant, assistant chief clerk, and chief clerk prior to his previous position. He is a member of the Institute of Internal Auditors.

Mr. Mickelsen, Assistant Secretary since 1953, has taken on the added duties of Assistant Treasurer of the company, but will continue to carry out primarily the duties of assistant secretary. A native of Shelley, Ida., he joined UP&L in 1937. He worked as a stenographer-typist in the Accounting Department, secretary to the treasurer, a clerk, secretary to the president, and insurance agent in general accounting before being named assistant secretary of the company.

Ebasco Services Inc. has added a Nuclear Engineering Division to its Engineering Department to render services on all phases of atomic energy applications to utility companies, industrial concerns, business enterprises, and financial institutions.

Leonard F. C. Reichle, who has transferred to Ebasco from the post of Assistant Director of the Reactor Development Division of the U. S. Atomic Energy Commission, has been appointed Nuclear Engineering Director. **Walter F. Friend,** who has been actively engaged in the nuclear activities of the company, will continue as Nuclear Engineer.

Modern Wiring

(*Continued from page* 394)

future call for this trillion kilowatthours in the years indicated. For emphasis, comparison can be made with the immediately prewar annual use of but 100 billion kilowatthours.

I am not certain that I understand what a trillion is. Yet this goal of electricity use and with it, the necessarily large national goals for the production of equipment for the generation, transmission, distribution, and ultimate use of this electricity are confidently expected to be attained during the next 15 years or so. I am sure that, if we in the Philadelphia area are to obtain our share of these trillion annual kilowatthours, elimination of the bottleneck of inadequate wiring is inescapable.

Greatest Sales Challenge

Here is the greatest sales challenge ever to face the electrical industry! It is my considered opinion that it is the job of all of us in this industry to provide "Modern Wiring —*The* Key to a Brilliant Future." You have learned what the rewards can be to each branch of the industry when that key opens the door to greater future sales of electricity and electrical equipment.

Let's get to work, each doing his share, each helping the other, each, including the customer, profiting. In other words, let's really sell.

Accounting System Design Problems

(*Continued from page* 400)

grammers to have a good knowledge of customer accounting. We believe that this will reduce the supervisory coordination between the two groups and will enable them to understand each other's language and problems. So far, this arrangement is working quite satisfactorily.

The last observation I want to make is that system design may well be more universal in its application than programming. Many of the decisions which we have arrived at are just as applicable to other utilities as to Con Edison and it may be that others can benefit from our experience and thinking in this area and we can benefit from theirs. Programming, however, because it involves the most minute detail, is not as useful to other companies. Rate schedules differ, company policies differ, and personal preferences of executives must be considered. We have examined the detailed programming of several industrial concerns using electronic computers for payroll work and find they are of little use to us. It therefore appears to us at this point that each company is on its own as far as programming is concerned, but might be able to use some of the system design work of other utilities.

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